December 1, 1939

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Rayon for Tires

L. A. Yerkes, Jr.[1]

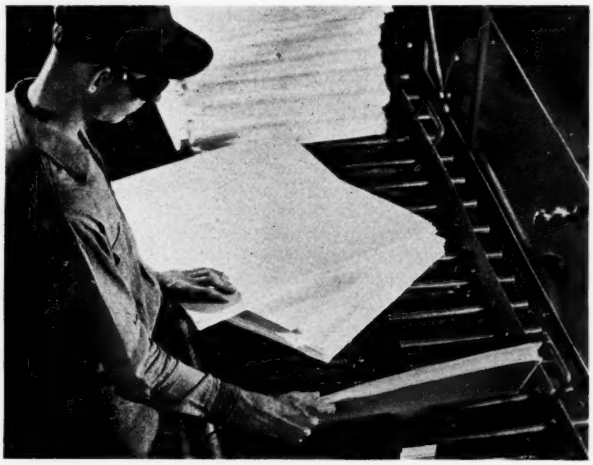

Fig. 1. Loading a Steeping Press with Linter Sheets

THE history of rayon manufacture in this country is a record of tremendously increasing consumption, arising largely from improvements in properties of the yarn and reduction in its cost. Not only has its appeal been manifested in the field of fashion through such esthetic characteristics as brilliance in dyeing, beautiful draping qualities, subdued luster, and interesting textural effects, but rayon has recently proved its versatility by making a worthy record in the industrial field. In view of its proven merit and its future possibilities in the rubber tire industry, it is of interest to examine the method of manufacture of rayon for tires and to point out the properties which confer on this synthetic yarn its unique advantages in that field of use. Data given in this article apply to the du Pont rayon of exceptionally high strength, known as "Cordura"[2] rayon, which was developed especially for tire fabric purposes.

Rayon Manufacturing Processes

Rayon is the generic name assigned to all synthetic filaments made from cellulose by a process combining chemical and mechanical treatments. At present rayon is made by three methods in this country, but only one of these—the viscose process—is employed in the manufacture of "Cordura" rayon for tire cords. A series of chemical and mechanical operations is involved in the transformation of cellulose into "Cordura" rayon, which is essentially a regenerated cellulose. The object of the following steps is to transform natural cellulose into a solution which may be passed through an orifice and solidified in the form of a continuous filament.

Pulp Preparation

Wood pulp, derived chiefly from spruce and hemlock by the sulphite digestion process, and cotton cellulose obtained from linters are the principal sources of natural cellulose in the rayon industry. Du Pont "Cordura" rayon is derived entirely from cotton linters, which are the fibers remaining on the cotton seed after the ginning process. The linters are removed from the seeds by a mechanical process, "cooked" under pressure to remove impurities, then washed and bleached and formed into sheets. Care is exercised throughout the process to produce a purified

Fig. 2. Removing Alkali-Cellulose Crumb from a Shredder

[1] Rayon Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

[2] "Cordura" is a trade mark, registered U. S. Patent Office, and is used by du Pont to identify its high-tenacity rayon yarn.

Fig. 3. Removing Cellulose-Xanthate from Baratte

cellulose sheet with the minimum of degradation in the molecular structure of the fibers.

Steeping

Linters sheets are immersed in a solution of caustic soda to transform the cellulose into what is probably both a physical and chemical combination of sodium hydroxide and cellulose, known as alkali-cellulose. This is essentially a mercerizing process illustrated in Figure 1, which shows a steeping press being charged with linters sheets.

Pressing and Shredding

The purpose of these operations is to transform the alkali-cellulose into a suitable physical form for subsequent reaction with carbon disulphide. The wet sheets in the steeping press are compressed to about three times their original dry weight. Then they are removed and charged into a shredder, which by a combined cutting, shearing, and mixing action changes the alkali cellulose sheets into the fluffy, crumb-like structure shown in Figure 2. The crumbs are next aged under controlled temperature, a procedure by which the viscosity characteristics of the resultant viscose are controlled as a result of changes in the molecular structure of the cellulose.

Xanthation and Mixing

This phase involves a reaction of carbon disulphide with the aged alkali-cellulose crumbs in slowly revolving drums, known as barattes. As chemical combination ensues, the white alkali-cellulose crumbs assume an orange color, forming the derivative known as cellulose-xanthate which in Figure 3 is shown being removed from a baratte. The cellulose xanthate is then dissolved in an aqueous solution of caustic soda to form a syrupy liquid called viscose.

Viscose Ripening

Since the caustic solution of cellulose xanthate is unstable, it must be used within a few days after preparation. Under controlled conditions it is allowed to decompose by hydrolysis until its chemical and colloidal properties are suitable for the production of "Cordura" rayon. During this stage impurities are removed by filtration and the solution is deaerated to remove all gas and air bubbles which might later interfere with spinning.

Spinning

At the proper stage of ripening the alkaline viscose is extruded through minute orifices in a multiple-holed nozzle or spinneret into an acid spinning bath, which coagulates the viscose solution into a gel-like filament structure by neutralizing the caustic in the viscose. This coagulation into a solid filament is followed by a regeneration of the cellulose from the cellulose xanthate as the filaments pass through the spinning bath. Figure 4 shows the many fine filaments of rayon, each issuing from a single hole of the spinneret, being coagulated in the spinning bath and then merging into a yarn, which in the illustration is held out of the spinning bath by the gloved hand to show its appearance at this stage.

The spinning or coagulating bath is composed of a warm aqueous solution of sulphuric acid, inorganic sulphates (usually sodium sulphate and zinc sulphate), and sometimes glucose.

The spinneret is a small cup of platinum alloy, perforated at its base with a number of holes corresponding with the number of filaments desired in the yarn. Hole sizes of 0.003- to 0.004-inch are common. The size of the rayon yarn is determined by the amount of viscose forced through the holes per unit time and the speed with which the yarn is drawn from the bath.

The rayon filament as it enters the spinning bath is essentially round, but as it is reacted upon in the bath, it shrinks and causes the initially formed surface skin to collapse, thus normally producing a fiber with a crenulated cross-section.

At this stage the gel yarn is drawn off over guides on to a feed wheel and thence into a rapidly revolving pot or bucket where a cake of rayon is formed and removed periodically. In other processes the rayon is enrolled on a perforated bobbin. Removal of the package constitutes the first deliberate break in the continuity of the filaments of rayon yarn. In a fine size the yarn attains a length of over 50 miles before a knot occurs.

A number of individual spinning units are usually combined into one spinning machine. Figure 5 is a general view of one type of spinning machine at the Richmond, Va., rayon plant of E. I. du Pont de Nemours & Co., Inc. The diagonal, parallel white lines are the gel rayon yarns leaving the spinning bath from each spinning position, which, after passing over the disk or feed wheel at the top of the frame, are drawn down into the pot or bucket directly back of the spinning bath.

The spinning conditions influence to a considerable degree the properties of the rayon yarn. The tensile strength

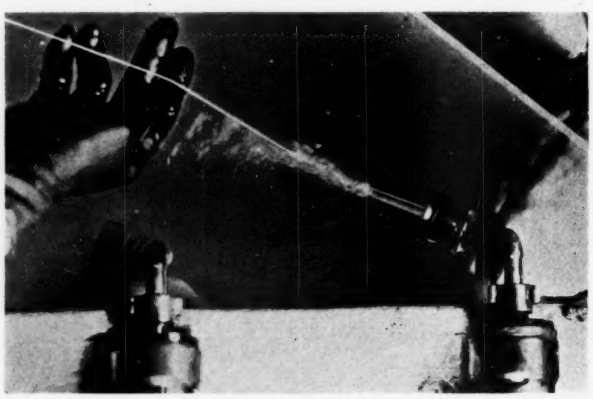

Fig. 4. Production of Rayon Yarn from Viscose Spinning Solution

of viscose rayon, for example, depends largely on the amount of tension and stretch imposed on the gel yarn during spinning. Tension during spinning orients the cellulose micelles in a direction parallel to the fiber axis. The higher the degree of this orientation, the greater will be the tensile strength. Tension control is accomplished either by passing the yarn around rods or rollers which produce a frictional drag or by stretching the yarn between two large positively driven rollers. Improvements in the raw cellulose, alterations in the process of making the viscose solution, and changes in the spinning bath contribute to the strength of rayon, but the major factor is the application of tension. Proper application of these process factors gives "Cordura" yarn its great tensile strength and other physical properties useful in tire cords.

Purifying and Packing

The yarn, as it comes from the spinning machine, contains spinning bath liquor, which is removed by washing. Subsequent purifying and finishing treatments precede the packaging of the yarn is required for various industries. For the tire trade the customary type of package is an 800-pound beam which can be mounted on the twister in the cotton mill for conversion into tire cord.

Conversion into Tire Cord

The du Pont company supplies only single ends of "Cordura" rayon for the tire industry. Any desired denier or size can be made. Currently, the most popular size is a 275 denier yarn comprised of 120 filaments, twisted to four turns per inch. This size corresponds in bulk to a 23 single cotton count. The 275 denier yarn is plied and cabled into any desired cord construction by the cotton mills, which also weave the cord fabric for the tire manufacturer.

Properties of "Cordura" Rayon Tire Cord

Since all of the manufacturing steps depicted above are under the control of the manufacturer at all times, it is evident that rayon can be made exceedingly uniform. It has been stated that a pound of cotton contains 135 million fibers, no two of which are alike. A pound of 275 denier "Cordura," on the other hand, has 120 filaments, all exactly alike. When one considers this point and realizes that "Cordura" is chemically nothing but cotton, it is obvious that the chemist has improved on nature's handiwork by making the quality, regularity, and strength no longer dependent on seasonal and climatic conditions. In view of this manufacturing control, rayon also has the important economic advantage of price stability.

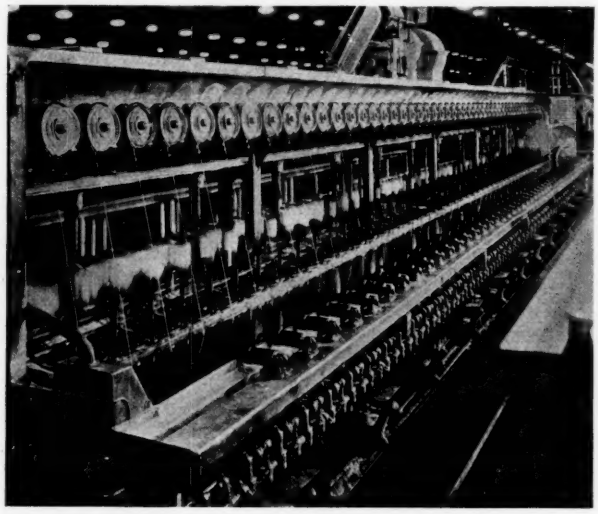

Fig. 5. General View of Rayon Spinning Machine

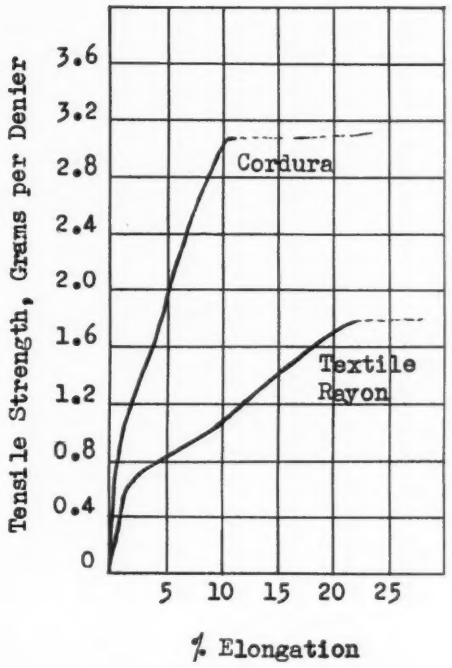

Fig. 6. Yarn Elongation Incline Plate Loading Rate: 4 Gms./Den./Min.

Tensile Strength

Tire cords were first made from rayon by the du Pont company in 1924 and by Goodyear in 1926. Neither of these ventures into the new field were successful, owing to the very low tensile strength and high permanent elongation at low loads characteristic of the rayon then available.

In more recent years the combined efforts of the du Pont Rayon Department and the tire company laboratories have resulted in "Cordura" rayon, developed expressly for use in tire cords. This work has culminated in the development of "Cordura" rayon, which is markedly superior to standard rayon in tensile strength, as indicated by the following tensile comparison—"Cordura" rayon 3.2 grams per denier dry tenacity; standard rayon 1.8 grams per denier dry tenacity.

Stress-Strain Curve

"Cordura" rayon is quite different in its properties from standard textile rayon, not only in degree, but in kind. The stress-strain curves have quite different characteristics. This difference has much to do with the success of "Cordura" in cords, where this type of stress-strain characteristic is necessary. As indicated in Figure 6, "Cordura" yarn shows no point at which it starts to elongate rapidly with increasing loads. That similar relations persist in cords made from this yarn is shown by the stress-strain curves for a 275/5/3 "Cordura" tire cord in Figure 7.

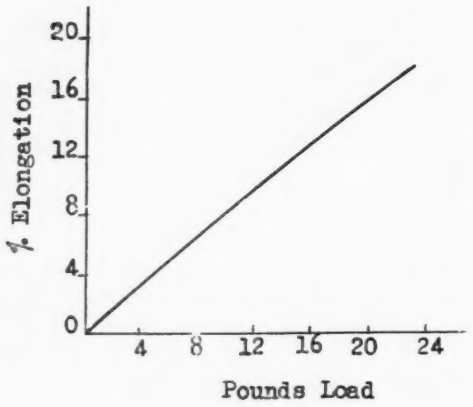

Fig. 7. Elongation for 275/5/3 "Cordura" Cord

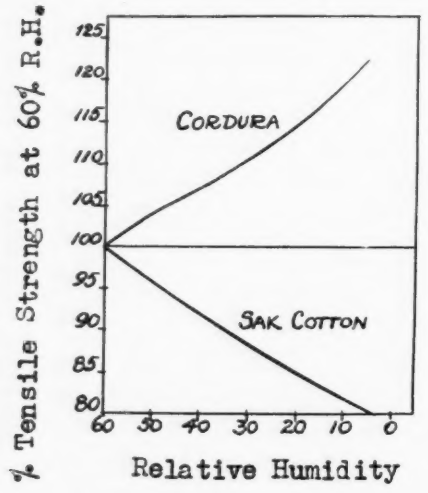

Fig. 8. Tensile Strength vs. Relative Humidity

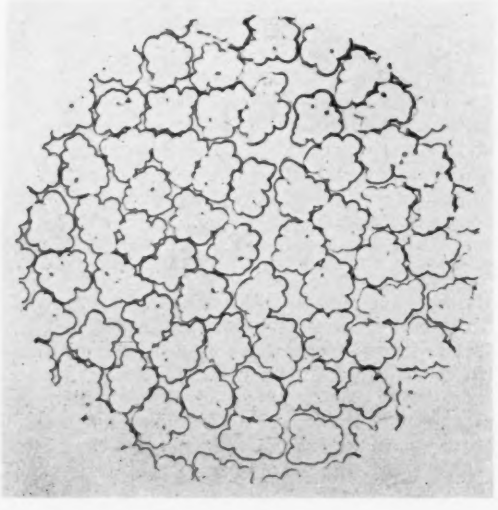

Fig. 9. Filament Cross-Sections, "Cordura" Yarn

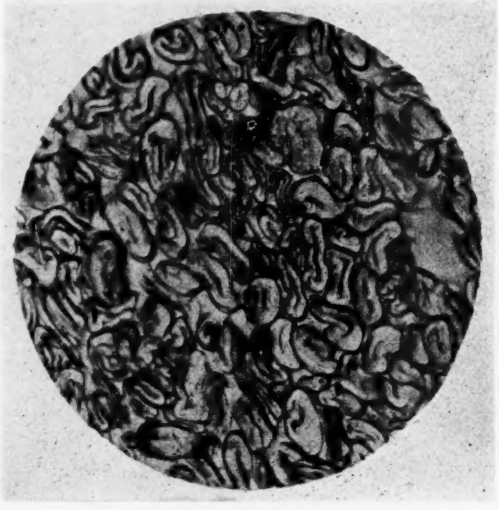

Fig. 10. Fiber Cross-Sections, Cotton

Moisture and Heat Relations

Investigators who, after years of experience with cotton, turn to this new material, rayon, must orient themselves to its distinctly different behavior. For example, the moisture equilibrium curve is important when one is considering the atmospheric conditions required in a twisting room and fabric storeroom. An interesting and most significant difference between "Cordura" rayon and cotton resides in its change in physical properties with change in moisture content. As is well known, cotton loses strength as moisture is removed from the fiber. Rayon, on the other hand, increases in strength. These relations are indicated in Figure 8. Since tires in use heat up and the fabric is dried, this characteristic is a very important factor in tire design.

The advantage of "Cordura" rayon when the objective is high tenacity at elevated temperatures can be brought out by making tests under the following conditions: 70° F.—65% R. H.; 70° F.—bone dry; and 250° F.—bone dry. If we compare rayon and cotton cords having the same strength under the first condition, then under the second condition the "Cordura" cord will be about 30% stronger, and under the third about 36% stronger.

Uniformity

In any important raw material, uniformity is a cardinal virtue. The differences in the cotton staple fiber diameter and length and in the physical character of the cellulose, due quite largely to variations in the soil and climatic conditions under which the cotton was grown, are non-existent in the case of rayon. Figures 9 and 10 illustrate the greater uniformity in filament cross-sections of "Cordura" rayon. A similar marked contrast is shown on Figure 11, in the case of tire cord singles; while Figure 12 illustrates the greater uniformity possible in "Cordura" rayon cords.

The uniformity in physical properties of "Cordura" rayon is clearly shown in Table 1. Comparisons between the uniformity of "Cordura" and cotton tire cords are shown in Figures 13 and 14, in which case data for the comparison were obtained by testing every tenth cord across the entire width of a roll of fabric. Every break has been recorded. The graph shows the per cent. variation from the average, for both breaking elongation and elongation under 10-pound load.

TABLE 1. UNIFORMITY OF "CORDURA" YARNS AND CORDS

		Average Deviation % of the Average	Maximum Deviation %
Yarn			
Beam to beam deviations 18 beams from one day	Tenacity	0.95%	2.7%
	Elongation	1.40%	4.3%
Cords			
14 consecutive daily lots, by lots	Denier	0.58%	1.3%
	Tenacity	0.80%	2.0%
	Elongation	1.85%	3.4%
One shipment of 26 daily lots scattered over six months	Denier	0.77%	3.5%
	Tenacity	2.10%	5.0%
	Elongation	3.70%	15.0%

Fatigue

Resistance to fatigue, which is very desirable, is dependent upon flexibility, toughness, true elasticity, tensile strength, compressive strength, resistance to shearing, etc. Because of this, it becomes extremely difficult to measure, and yet because of its importance, every technical department attempts to measure it. Regardless of the wide divergence in opinion as to the best fatigue testing methods and technique, all laboratories that have evaluated rayon cords show fatigue values several times that of cotton. This advantage is accentuated when the tests are conducted at high temperatures.

Adhesion

The one real set-back in this development of rayon for use in tires occurred when it was realized that rubber had poor adhesion to the rayon cord. This was not for any chemical reason, but because the rayon cord is free from the lint or fuzz which is largely responsible for the adhesion between cotton and rubber. Treatments have been developed for rayon tire cords so that today satisfactory adhesion values are being obtained. If necessary, the treatments can be varied so that these values can be increased two-fold.

Density

Much has been said recently regarding cords of improved density. Density, of course, permits the making of a thinner carcass with the same strength. From the point of view of lower temperature, easier riding, and longer life, the advantages of a thinner carcass with the same strength are evident. We believe a denser cord can be made from rayon than from any other product. By this is meant a cord having a higher tensile strength per square inch of cross-section. It will stand more flexing, that is, have a higher fatigue value. Here it is impossible to quote specific examples because of the diversifica-

(*Continued on page* 49)

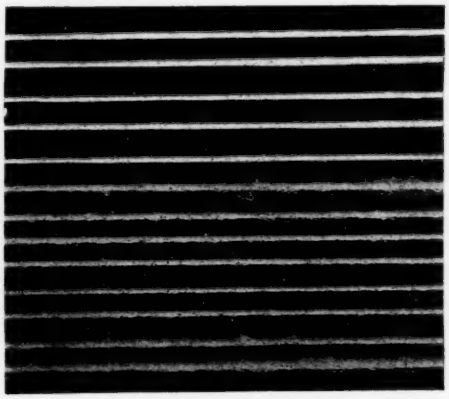

Fig. 11. Tire Cord Singles: *Top*, "Cordura;" *Bottom*, Cotton

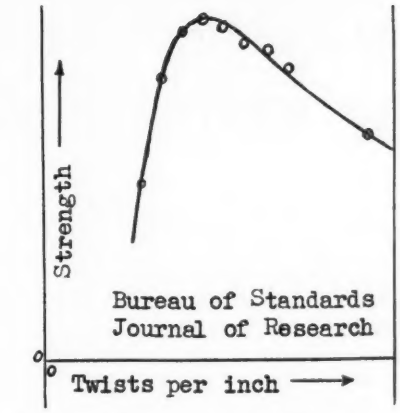

Fig. 15. Twist vs. Strength—Cotton Singles

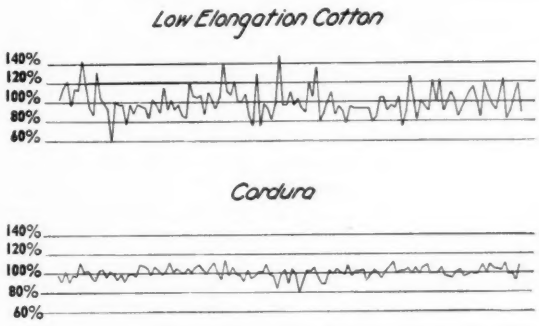

Fig. 14. Uniformity of Cord Fabrics—Elongation 10 Lbs. Load

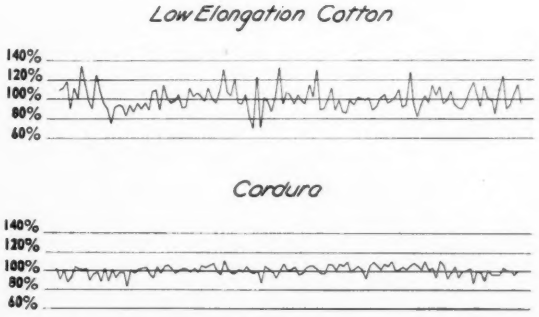

Fig. 13. Uniformity of Cord Fabrics—Breaking Elongation

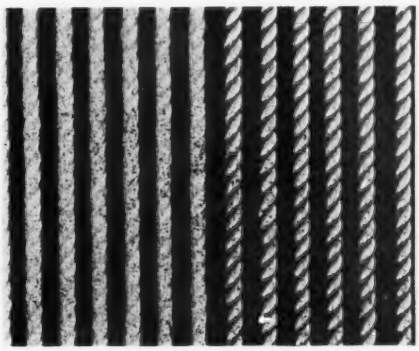

Fig. 12. Tire Cords: *Left*, Cotton; *Right*, "Cordura"

Distributers' Tire Stocks in the United States, October 1, 1939[1]

THE results of the quarterly survey of retail stocks of automobile tires and inner tubes, as of October 1, 1939, are shown below in comparison with summary data for preceding quarterly surveys, the bases and methods described in previous reports having been used in calculating the stocks held by the following three groups of distributers: (1) Individual dealers, including large and small retailers. (2) Distributers through oil company-chains. (3) Manufacturer-owned-and-operated stores, mail-order houses, and other important retail chains.

Distributers' Stocks Indicated by Surveys

Total distributers' stocks of motor vehicle casings on October 1, 1939, are estimated at 6,859,000, a decline of only 43,000 during the third quarter. The decline in the third quarter of 1938 was estimated at 591,000 casings, and in the 1937 third quarter at 595,000—hence the unusually heavy replacement shipments in September this year brought distributers' stocks above normal, considered from the seasonal standpoint. An actual increase occurred in dealers' stocks, declines being indicated in oil-company and other mass distributers' stocks. Dealers' stocks on October 1 are at the highest figure since July 1, 1937; while oil-company stocks stand at the lowest figure estimated in these quarterly surveys.

	Thousands of Casings			
1936	Dealers	Oil Companies	Other	Total
Estimated	3,500	1,650	2,000	7,150
1937				
April 1	3,835	1,853	2,304	7,992
July 1	3,363	1,996	2,299	7,658
October 1	3,000	1,774	2,289	7,063
1938				
January 1	3,015	2,115	1,920	7,050
April 1	3,007	1,869	2,051	6,927
July 1	2,767	2,079	2,163	7,009
October 1	2,588	1,840	1,990	6,418
1939				
January 1	2,735	1,838	1,920	6,493
April 1	3,018	1,725	2,074	6,817
July 1	2,900	1,646	2,356R	6,902R
October 1	3,122	1,487	2,250	6,859

There has been a progressive decline, which has now nearly run its course, in total stocks of inner tubes reported in the period covered by these surveys. Mass distributers (oil company and other) have found it unnecessary to carry so large stocks of inner tubes as was formerly customary, and dealers are showing a growing tendency similarly to reduce the ratio of tubes to casings, particularly the larger dealers, in recent surveys. There was practically no change in inner tube stocks for the quarter, slight increases being registered in stocks of dealers and oil companies, and a slight decline in other stocks.

	Thousands of Inner Tubes			
1937	Dealers	Oil Companies	Other	Total
April 1	4,910	2,019	2,170	9,099
July 1	4,050	1,960	2,129	8,139
October 1	3,525	1,957	2,038	7,520
1938				
January 1	3,547	2,127	1,717	7,391
April 1	4,021	1,918	1,728	7,667
July 1	3,560	1,805	1,786	7,151
October 1	3,132	1,781	1,727	6,640
1939				
January 1	3,445	1,733	1,599	6,777
April 1	3,460	1,626	1,588	6,674
July 1	3,206C	1,393	1,829R	6,428R
October 1	3,220	1,406	1,793	6,419

Dealers' Reported Stocks

The following table compares the stocks reported by 1,330 dealers for 1,817 stores in the current survey, with the stocks reported by the identical firms July 1, 1939. Dealers holding under 200 casings each on October 1 report reduced stocks; while stocks of the larger dealers have increased, resulting in an overall increase in dealers' stocks of both casings and inner tubes during the third quarter. In each of the past two years a decline in dealers' stocks of both casings and inner tubes occurred during the third quarter; hence the increase this year is anti-seasonal, resulting from unusually heavy September takings.

Number of Casings	Number of		July 1, 1939		October 1, 1939	
	Dealers	Stores	Casings	Tubes	Casings	Tubes
Under 200	888	1,024	74,345	103,940	72,948	99,203
200 - 500	267	371	69,156	87,019	81,960	87,958
Over 500	175	422	226,864	219,873	245,275	227,658
Total	1,330	1,817	370,365	410,832	400,183	414,819
Other Oct., 1939.	473	601	.....	.....	120,416	122,772
Total October	1,803	2,418	.....	.....	520,599	537,591
Index Numbers...	.....	.....	82.5	91.6	89.2	92.0

The steadily increasing concentration of tire production in a few leading sizes is reducing dealers' needs for carrying so large stocks as formerly, particularly in the case of inner tubes where diversity of lines is less pronounced than for casings. The increase in dealers' stocks of inner tubes during the third quarter was negligible.

Oil-Company Distributers' Reported Stocks

Reports were received from 38 identical firms distributing tires through chains of filling stations, some reports covering stocks in central warehouses only while others also covered stocks in retail outlets, in the July and October surveys. A continuation of the decline in stocks of casings (although the reduction was less than in the third quarter of 1938) brings October 1 stocks to the lowest level record in any of these quarterly surveys. A slight increase in the stocks of inner tubes, noted in the comparative totals, is reflected in the index numbers and summary estimates.

	Comparative Totals		Other
	July 1	October 1	October 1
Number of firms	38	38	3
Casings	970,380	876,379	3,190
Inner tubes	824,054	828,984	4,479
Index Numbers:			
Casings	99.8	90.1	....
Tubes	84.4	85.2	....

Other Mass Distributers' Reported Stocks

Reports were received from six tire manufacturers operating 2,133 (July, 2,165) retail stores and covering stocks held in these outlets, and from eight other mass distributers operating 2,044 (July, 1,886) stores and cov-

(*Continued on page* 49)

[1] Special Circular Vol. 13, No. 19, Rubber Section, Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.
R—Revised. C—Corrected.

Solvents in the Rubber Industry—I

Ralph K. Strong[1] and Kenneth Tator[2]

THE solution of rubber, a lyophillic colloid, occurs in two distinct stages. The first is gelation, the rubber absorbing the solvent and thereby swelling to several times its original volume. After maximum gelation, the second stage is perfected by the further addition of solvent which, especially when expedited by mechanical disturbances, causes a reversal of phase and disperses the rubber into the liquid solvent, forming a colloidal solution.

The relative amount of these two stages depends to a large degree upon the state of polymerization of the rubber. The lower the state of polymerization, the more rapid and less marked will be the gelation stage; consequently the time necessary for complete solution will be shortened. Conversely, the higher the state of polymerization, the longer the time required for the gelation process, and the greater the difficulty of solution. As an extreme condition, the polymerization which accompanies vulcanization is sometimes so great that the reversal of phase, or the dispersion of the rubber into a colloidal solution, is impossible although vulcanized rubber may swell to several times its original volume in a solvent.

The greatest single application of solvents in the rubber industry is as the solvent for rubber itself. The solvents used are principally hydrocarbons. To a smaller but important extent solvents are used for other purposes. The present and potential uses of solvents in this industry are so numerous that it is desirable to discuss them in the consecutive order of the derivation and manufacture of rubber.

Harvesting of Certain Natural Rubbers

While the better and more valuable grades of rubber can be procured from the rubber bearing plant as a latex, in certain lower grades of rubber the latex is either so unstable that it coagulates immediately on exposure to air, or the rubber does not exist in the plant as a latex, but as a film of rubber under the bark. In such cases tapping the tree is insufficient to obtain rubber.

As these lower grade rubbers, of which guayule is a notable example, are in a lower degree of polymerization, it is entirely feasible to extract them from the rubber plant by the use of solvents. The gelation stage is of little consequence, and mechanical mastication of the rubber to get it into solution is not necessary. The details of this extraction process would include the stripping of the rubber bearing plant, probably the crushing and drying of the plant fragments, placing these in a leaching vessel and extracting with solvent, followed by evaporation of the solvent, and finally recovery of the solvent and of the rubber.

Solvents for this purpose should be good solvents for rubber and any desirable associated resins and, if possible, have a preferentially non-solvent action on the undesirable constituents of the shrub. They should have such viscosity and penetrating properties that they may readily penetrate the interstices and percolate freely through the fragments. The boiling range should be such that recovery of the rubber from the solvent is complete and rapid. They should contain no non-volatile foots which left in the rubber would detract from its qualities. They must be of satisfactory volatility for use in climates where rubber-bearing plants thrive. They must also be relatively cheap so that losses by evaporation and in the discarded spent fiber are reduced to a minimum. An examination of the properties of the solvent hydrocarbons obtained from petroleum and coal tar, as well as the chlorinated hydrocarbons, shows that the demands can be met by these three groups of solvents.

It seems somewhat curious that a large Californian producer of guayule rubber has chosen the cumbersome and expensive process of gathering, drying, and crushing the plant, and then subjecting these dried and crushed scraps to high pressure in water in order to waterlog the fibrous materials so that they will settle away from the rubber particles. The rubber particles are skimmed from the water surface, dried, and compacted on regulation rubber rolls. A solvent process would appear to be more economical.

Purification of Rubber

Some forms of crude rubber as it comes from the plantation may contain an appreciable quantity of bark, earth, and other undesirable impurities. In practice these are removed in several ways, such as by screening, or by washing with solvents. In some operations, especially those in which the rubber is to be subsequently used as a fluid, as in dipping and spraying operations or in impregnation, it is practical to prepare the fluid solution and let it remain in a vessel whereby the solid impurities either settle or rise with respect to the solution, depending upon the relative densities. The clean solution is then decanted from the impurities. When rubber is not to be used as fluid solution, it is desirable to wash the rubber with solvents in rubber washing rolls or in internal kneading machines.

In addition to the rubber hydrocarbon natural rubber contains resins, proteins, and water-soluble materials. For purposes where these resins and proteins are not desired they may be reduced or eliminated by dissolving them in solvents that do not also dissolve the rubber hydrocarbon. This purification may be carried out on standard rubber washing rolls or in internal mixers. These methods are slow and incomplete, but for most purposes undoubtedly are sufficiently thorough and inexpensive for large-scale operation. A better purification can be effected by dissolving the rubber portion in a solvent such as benzol or naphtha and precipitating the rubber from its solution by adding acetone or alcohol. In this process acetone or alcohol dissolves the resin while precipitating the rubber hydrocarbon. The rubber, during precipitation, occludes a certain amount of the impurities, and in order to obtain a completely resin-free material it may be necessary to repeat the dissolving and precipitating. As a matter of academic interest, it may be said that further purification has been obtained by crystallizing the rubber hydrocarbon from its solution, but it is doubtful if such a process can be of immediate and profitable commercial operation.

Plastication of Rubber

To incorporate fillers and other compounding agents with crude rubber, and to render the rubber suitable for processing by molding, calendering, extruding, and proofing, and to increase its solubility for use in rubber solution, it is usually necessary to soften or plasticize the

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[2] Chemical engineer, Egypt, Mass.

rubber. There are two general methods for softening rubber: first, to effect a controlled depolymerization of the rubber molecule; and second, by the use of solvent plasticizers.

Use of Depolymerizing Agents

Depolymerization is brought about commercially by subjecting the rubber to intense shearing action in rubber mills, Banbury mixers, or plasticators. These methods require large amounts of power. Other physical ways of bringing about this depolymerization are to subject the rubber to temperatures in excess of 150° C., or, less practically, to the action of ultra-violet light. These methods involve the installation of equipment of high initial and high maintenance costs.

Another method is by means of chemical reagents. Copper and manganese compounds in very small concentrations are found to catalyze this depolymerization reaction. Rubber may also be softened by oxidation, and therefore any material which carries oxygen into the rubber or in any other way facilitates a receptivity of the rubber for oxygen results in a consequent softening of the rubber. Certain liquids normally considered solvents have a definite depolymerizing action upon rubber. These include such substances as turpentine and tetrahydronaphthalene.

In general, any treatment that causes softening by depolymerization should be avoided, unless that method is susceptible of very careful control, such as is assured by the mechanical methods mentioned. Chemical reagents should usually be avoided, since if depolymerization is carried too far, the physical properties of the rubber are seriously impaired, and generally the action of chemical depolymerizing agents cannot be stopped at will.

Use of Solvent Plasticizers

The second way of accomplishing the desired plastication is by the use of solvent plasticizers, which do not cause depolymerization and do not adversely affect the quality. These plasticizers are usually added in proportions of 1 to 2% calculated on the weight of the rubber. They do not cause solution of the rubber, but on the contrary they are dissolved in the rubber. As might be expected, these solvent plasticizers are frequently the higher boiling and less volatile fractions of those hydrocarbons which constitute the volatile solvents for crude rubber. Solvent plasticizers normally fall into two groups.

TEMPORARY PLASTICIZERS. Since it is sometimes desirable to soften rubber so that its processing in subsequent operations will be facilitated and to retain in the finished product a tough elastic condition, the plasticizer selected for this purpose should have a considerable degree of volatility in order that the softener will be retained in the rubber only during the desired manufacturing processes. It is desirable that such plasticizers be volatilized and thus leave the rubber either during the time the rubber is subjected to the relatively high temperature of vulcanization or slowly at ordinary temperature. Well-refined pine oil is such a plasticizer.

PERMANENT PLASTICIZERS. When it is sometimes desirable to plasticize the rubber permanently, the softener or plasticizer should be strictly non-volatile. Such rubber solvents as paraffin and other waxes, higher fatty acids, coal tars, and various pitches and resins are suitable materials for this purpose.

Solvents as Aids of Mixing

To mix compounding ingredients completely and uniformly into rubber it is sometimes advantageous from the standpoint of time to do this with the aid of solvents. Owing to their relatively high softening point or for some other physical reason some ingredients such as glue, shellac, and the harder fossil copal gums do not readily flux into rubber unless the temperature is sufficiently high to endanger the quality of the rubber. With such ingredients it is sometimes advantageous to plasticize with a low-volatile solvent in order that the incorporation may take place without undue increase of temperature.

Other substances having high chemical reactivity must be mixed with rubber very rapidly to avoid chemical reactions that would retard further introduction or dispersion of the substances into the rubber. Such substances are the active vulcanizing ingredients used in the cold rubber cures, to be discussed later under "Vulcanization" [Part II].

Preparation and Application of Rubber Solutions

Rubber solutions vary in form from the heavy doughy mass used in proofing fabrics to the thin mobile solutions used in spraying and dipping, but they are all prepared in substantially the same manner, by the gradual addition of solvents to rubber in a solvent mixer or churn. The rubber undergoes its gelation stage and subsequent reversal of phase while being continuously and actively kneaded. It is essential that all of the rubber be in the active mixing zone at all times, that the solvent be added slowly, and that the time of mixing be sufficiently long for complete dissolving. The rubber solution should be decanted or strained after this process to remove particles of dirt or other impurities.

The rate of evaporation of the solvent is of extreme importance and immediately imposes restrictions upon the solvent selected. When the solution is used solely for producing a film on an object, it becomes necessary to use mixed solvents of varying degrees of volatility so as to avoid the formation of a surface film before drying is complete. Such external film formation would seriously retard elimination of residual solvent from the interior and would cause uneven drying. The latter would result in a non-uniform shrinkage of the film, thus causing an uneven surface. With such mixed solvents the lighter fractions vaporize first from the surface, and the remaining liquid fractions keep the surface soft and permeable to the passage of solvent from the interior to the surface. Petroleum or coal tar solvents or certain mixtures of pure solvents, such as chlorinated hydrocarbons, that contain components of sufficiently varying degrees of volatility satisfy this requirement. Unless permanent plasticization is desired, no solvent should be used which has a constituent that boils appreciably above 140° C.

This temperature limitation is imposed because of the fact that rubber has a critical temperature of about 150° C. at and above which depolymerization proceeds rapidly. Since rubber has a tendency to discolor even below 150° C., it is essential that transparent or light colored films be dried at as low a temperature as possible, and preferably below 100° C.

Depending upon their uses, rubber solutions are required with a wide range of rubber content and consistency. These requirements may be obtained by two general methods. The first is by depolymerization of the rubber. The greater the effect of the depolymerizing treatment, such as is obtained by the use of rubber mills or Banbury mixers, or by heating above 150° C., the greater will be the allowable rubber content of a solution at a given viscosity, or, conversely, the more fluid the solution will be at a given rubber content. The second method of securing a wide range of rubber content in the solution is by the use of a proper solvent. The more

active the solvent the greater is the allowable rubber content at a given viscosity, or the more fluid the solution at a given rubber content. In the following series of solvents (1) the solvent power for rubber decreases progressively, (2) the rubber content at a given viscosity decreases, and (3) the viscosity at a given rubber content increases: chlorinated hydrocarbons; carbon bisulphide; coal tar hydrocarbons; petroleum hydrocarbons; ethyl ether.

Rubber proofing cements or doughs, usually applied by spreading under doctor knives or on calender rolls, should have a high viscosity and a high rubber content as they are used to coat fabrics with a heavy deposit of rubber upon the surface. With rubber cements for impregnating textiles or fibrous sheets, the rubber should coat the fibers throughout the sheet rather than only those on the surface; therefore the fluidity of the compound should be such as to insure passage into the interior. The rubber content should be adjusted so that the desired amount of rubber shall remain as a deposit.

With dipping cements for depositing a film on a solid form, the fluidity should be high so that proper drainage and an even surface coating are assured, and at the same time the rubber content should be high in order to obtain a film of maximum thickness at each dipping.

Spraying rubber solutions, as the name indicates, are sprayed through an air gun on to the surface to be coated and should be made with solvents which have a higher boiling range than is customary with the previously described solutions so that evaporation of the solvent will not take place before the spray has come in contact with the surface. Condensation of water vapor from the air is a more important factor in this operation than in the coating operation previously discussed, since any water that is condensed upon the coating from the air, owing to the cooling of the surrounding air by the heat absorbed in vaporization of the solvent, will be occluded in the coating rather than on its surface as in the other processes.

Solutions for rubber adhesives are made with varying degrees of fluidity and rubber content depending upon their application. With the exception of proofing compounds to be used in the manufacture of adhesive tapes and certain other adhesives, the rubber films or coatings are ultimately vulcanized.

Vulcanization of rubber in solution is not practicable as the polymerization which accompanies vulcanization causes the solution to set to a stiff and unworkable gel. It is, therefore, necessary to vulcanize the rubber film after its deposition and the subsequent evaporation of the solvent. This may be done by means of the Parkes or Peachey process, which will be described in Part II, or it can be accomplished by the so-called self-curing or air-curing cements which contain sulphur and all of the other vulcanizing ingredients except the accelerator. Upon mixing the accelerator in the rubber solution immediately prior to its application ample time is allowed for the solvent to evaporate before appreciable vulcanization takes place. Also, after applying the solution and allowing the solvent to evaporate the deposited rubber film may be washed with a solution of the accelerator.

(*To be concluded*)

Distributers' Tire Stocks

(*Continued from page* 46)

ering their total stocks on hand as of October 1. The manufacturers' stores were holding lower stocks of casings, but higher stocks of inner tubes than in July; the other firms reported reduced aggregate stocks of both casings and tubes. Stocks reported here by manufacturers are presumably also included in manufacturers' inventory as reported by The Rubber Manufacturers Association, Inc. Upward revisions resulting from delayed returns will be noted in the figures for July 1 mass distributers' stocks in the summary table, to agree with the 100% data given below.

	Reported Comparative Data	
	July 1	October 1
Number of firms	14	14
Number of stores	4,151	4,177
Casings	2,356,429	2,249,747
Tubes	1,828,522	1,793,199

Stocks of New York Dealers

Stocks reported by 94 New York State dealers with 116 stores in the current survey amount to 46,331 casings and 63,044 inner tubes, against 44,822 casings and 57,559 inner tubes reported by 105 dealers July 1. Of those reporting October 1, 61 held under 200 casings each, 17 between 200 and 500 casings, and 16 over 500 casings each. New York dealers accounted for 8.9% of the casings and 11.7% of the inner tubes reported by dealers in the current survey, against 9.3% and 10.7% respectively in July.

Acknowledgment

The support of The Rubber Manufacturers' Association, Inc., the assistance of the National Association of Independent Tire Dealers, and the cooperation and promptness of dealers, oil-company distributers, manufacturers, and other mass distributers in submitting data used in this report are gratefully acknowledged.

Rayon for Tires

(*Continued from page* 45)

tion in cord constructions being used.

Twist

The tire technician will soon come to realize another important difference between "Cordura" and cotton. Up to a certain point cotton yarn becomes stronger as the number of turns per inch increases. See Figure 15. The single ends of yarn going into a cotton cord must of necessity have a certain number of turns per inch. If the twist were lowered below that minimum, fiber slippage would occur. On the other hand the strength of rayon is not dependent on twist because of its continuous filament nature.

Advantages

The outstanding advantages of "Cordura" rayon for use in tire cords may be summarized as follows: continuous filaments, excellent uniformity, high strength when hot, very high fatigue value, high strength per unit cross-section, density, and price stability.

We wish to emphasize that "Cordura" rayon cannot be used as a direct substitute for cotton, but if this new material is studied, outstanding results may be obtained from it. Research on the part of the rayon manufacturer is steadily improving the characteristics of the material, and he has in his laboratory today the embryos of products far superior to that of the present.

Dispersion of Pigments in Aqueous Medium[1]

I. Mechanism and Evaluation of Dispersing Agents . . .

F. K. Daniel[2]

SURFACE active compounds have become indispensable ingredients in latex technology. This chemical group comprises all wetting and dispersing agents, protective colloids, most other stabilizers, cationic soaps used in producing positively charged latex, etc. Although these agents have certain features in common, there are essential differences in the functions they fulfill and in the mechanism they employ. These differences are not always observed clearly. A distinction between wetting and dispersing agents, for instance, is sometimes not recognized because there are cases where one chemical combines both functions. In spite of these cases, which are exceptions rather than the rule, it seems important to distinguish wetting from dispersion for a successful application of these agents.

Relation of Wetting, Dispersing, and Protecting Agents

A wetting agent is a material which is soluble in water and which in small quantities will materially reduce the surface tension of water. The reduction in surface tension is the most important factor in replacing the gas phase adsorbed on the surface of solids by the liquid phase. The lower the surface tension, the better, as a rule, the wetting power. Size and shape of the wetted surface are of no importance. Whether one large surface is to be wetted or a number of small articles which may either be single and independent or loosely or irreversibly combined makes no difference.

The wetting agent is not intended to cause any change in the state of agglomeration or dispersion of the particles. Where agglomerates are temporarily broken up mechanically in the presence of a wetting agent, they will reform as readily as though no agent were present. Where a wetting agent does affect the state of subdivision of the discontinuous phase, the effect is secondary. This can be a dispersing effect, one of the rare cases of a combination wetting-dispersing agent. More often the wetting agent itself or some impurity present detrimentally affects the dispersion, i.e., causes agglomeration or flocculation, but this does not diminish its value as a wetting agent. Wetting agents are known in great number; while there are relatively few true dispersing agents known.

In general dispersing agents do not reduce the surface tension of water to a marked extent and, therefore, do not materially improve the wetting power of the solution. If they do, it is merely incidental. The function of an aqueous dispersing agent is to deflocculate loose combinations of particles (usually by assistance from an outside mechanical force). Deflocculation means that all loosely aggregated particles in the flocs become completely independent of each other. This is achieved by overcoming the adhesion forces existing between particles; these forces are the cause of agglomeration or flocculation. Flocculation is a common behavior of microscopic particles in suspension. As a rule, particles of lyophobic character show stronger adhesion, i.e. more flocculation, than lyophilic particles. Therefore, dispersing agents show the greatest effect with highly flocculated hydrophobic systems. Lyophilic particles tend to disperse by themselves to some extent; therefore the effect of dispersing agents, even when producing complete deflocculation, is less spectacular in such systems.

A dispersing agent is not able to subdivide a homogeneous phase or to overcome such strong adhesion as exists in coagulated latex, for example. To redisperse such systems mechanical force is necessary.

The term "dispersing agent" is sometimes used to designate substances which are instrumental in mechanically disintegrating a homogeneous phase or a coagulum. Glue and bentonite belong to this group when used to make artificial latex from rubber or to produce asphalt dispersions. They should be more properly called "disintegrating agents."

A third kind of dispersing agent is that used to disperse a discontinuous solid phase in a continuous plastic phase. This represents an entirely different problem. The function of this type of dispersing agent is to reduce the amount of mechanical energy necessary to disperse the solid in the plastic phase. This is accomplished, it is believed, by the reduction of surface tension of the plastic, which makes this kind of dispersion resemble more a wetting than a dispersing mechanism. The dispersion of carbon black in rubber with stearic acid as the dispersing agent is an illustration of this type of dispersion. This paper is not concerned with such cases.

According to the above, the essential difference between a wetting and a dispersing agent lies in the fact that the former primarily changes the character of the liquid so that the contact angle with the solid is substantially reduced, while the latter directly changes the character of and is adsorbed at the liquid-solid interface. Dispersing agents do not function unless they are adsorbed on suspended particles. Owing to the polar-nonpolar character of dispersing agents, the affinity of their molecules toward hydrophobic particles is stronger than toward hydrophilic particles. In other words, the adsorption equilibrium is more favorable with hydrophobic than with hydrophilic surfaces, which is an additional reason why dispersing agents are more effective with hydrophobic particles.

The foregoing makes it understandable why the action of dispersing agents is so specific, i.e., why they are extremely efficient for some pigments, while completely ineffective for others. Wetting agents, influencing merely the liquid phase, have been found to be much less specific toward different pigments.

In order to obtain dispersion the adhesion forces between the particles must be reduced at least to a certain critical value where the Brownian movement becomes equal to or stronger than adhesion. The degree of dispersion increases as the repelling forces increase beyond the point of equilibrium.

Protective colloids, such as proteins, glue, starch, agar, etc., form a third group of surface active compounds, dif-

[1] In this article Part I deals with the relation of dispersing agents to wetting and protective agents, discusses the mechanisms involved, and presents the common methods for evaluating degree of dispersion. Part II, to appear in the January issue, will discuss the production, properties, and methods of testing highly dispersed systems. EDITOR'S NOTE.

[2] Horn Research Laboratories, Inc., Long Island City, N. Y.

ferent from the other two groups, although they sometimes may show dispersing or wetting properties in addition to their protective qualities. This condition does not make them identical with either the wetting or dispersing agents. Their mechanism resembles that of dispersing agents only insofar as their effect is centered on the solid-liquid interface.

Protective colloids are characterized by very large hydrophilic molecules in which the hydrophilic or polar groups are generally distributed more or less at random. The molecules of dispersing agents, on the other hand, are of polar-nonpolar structure with the polar groups concentrated at one section of the molecule, causing orientated adsorption.

A true dispersing agent is not of pronounced hydrophilic nature. A dispersion produced with such agents will generally follow the rules governing a hydrophobic system. A protective colloid, on the other hand, is strongly hydrophilic and gives the particles on which it is adsorbed a decidedly hydrophilic character. A dispersion produced with protective colloids will obey the rules governing hydrophilic systems. By the addition of protective colloids the adhesion forces between the particles may or may not be reduced, depending (1) on the nature of the protective colloid and (2) on the original adhesion between the particles themselves. But even though adhesion may increase with the addition of a protective colloid, the stability of the dispersion increases.[3] Such a system will not be easily flocculated or coagulated by electrolytes. In cases where adhesion forces are reduced by the presence of protective colloids, the system will still not behave as if dispersed by means of a true dispersing agent. This becomes apparent when observing the difference in properties of two liquid-solid systems, one produced with a protective colloid and the other, a dispersing agent. For instance, the viscosity of concentrated pastes will be higher when made with protective colloids than with dispersing agents.

The simultaneous use of protective colloids and dispersing agents should be avoided if possible, since complications arise owing to competing adsorption, which impair the effectiveness of both materials. Likewise, where wetting agents must be used with dispersing agents, utmost care has to be exercised in their selection in order to preserve both effects fully.

Tests for Degree of Dispersion

In the evaluation of dispersing agents it is important to be able to ascertain how nearly the ideal state of dispersion is approached. There are several known methods of testing for the degree of dispersion. Among these are: microscopic observation; filtration behavior; transparency; sedimentation; consistency; and outward appearance. These tests are briefly reviewed below, and in the second part of this paper a new method for quickly recognizing dispersing agents of high effectiveness will be presented.

Microscopic Technique

Microscopic observation may be carried out either under reflected or transmitted light. The former method is simpler, but of limited value, as it does not show the particles dispersed in the continuous phase. A paste is made of liquid and solid phase and is dried out. The smoother the resulting film and the finer its grain, the better is the dispersion, according to this test. Observation under transmitted light is carried out in extreme dilution of the solid phase and requires certain precautions for two reasons.

(1) Adsorption of the dispersing agent from the solution is a matter of equilibrium and, therefore, an amount of dispersing agent ample at normal pigment concentration may become insufficient at a high degree of dilution with the result that partial flocculation sets in.

(2) An actually well-dispersed system may appear flocculated because of imperfect technique when diluting. No matter how slowly and carefully the water is stirred in, the higher viscosity of the concentrated pigment dispersion makes it very difficult to distribute that phase uniformly throughout the phase of lower viscosity. Some large and a good number of small specks will remain. These break up only when the cover glass is pressed down on the slide, or, preferably, when the cover glass is slightly rotated on the slide. This should always be done before judging the state of dispersion. Generally, true agglomerates or flocculates will not be broken up by this manipulation, but if they do break up the single particles will recombine quickly as the result of Brownian motion.

Where due care is exercised in carrying out the test, this method is the best and most direct way of evaluating dispersion. It gives reproducible results which can be permanently recorded by microphotographs.

The Filter Test

Ordinary qualitative filter paper retains flocculates with little or no loss. Hence the filtrate of an undispersed suspension shows little or no color of the solid phase. Dispersed particles of the fineness of ordinary pigments (between approximately 0.2 and 2.0 microns) will pass through the filter. The higher the percentage of dispersed particles, the more opaque will be the filtrate. A colorimetric comparison will give a good indication as to the degree of dispersion of a certain system. A more quantitative result is obtained by a dry solid content determination of the filtrate, which gives directly the percentage of dispersed pigment.

Transparency

A dilute, well-dispersed suspension of pigment in a test tube is quite clear and transparent and will not show an opaque ring at the air-glass-liquid interface. A flocculated or partly flocculated suspension of equal strength will be somewhat opaque and will leave the glass wall slightly stained. This condition is because adhesion forces not only exist between the suspended particles, but also between the particles and the glass wall, to which the particles may adhere upon contact.

Sedimentation Tests

Obeying Stokes' Law, a flocculated system settles rapidly, leaving a clear layer of water on top, with a sharp demarcation line between the water and the suspension. The sediment (or cream, if the particles are lighter than water) occupies a comparatively large part of the total volume. The particles in a dispersed system settle very slowly, and no sharp line of demarcation is exhibited between the water layer and the suspension layer for a relatively long time. But once the particles have settled, they occupy a very small volume. This state is due to the fact that, upon settling, single particles pack very closely. Flocculates, on the other hand, with their highly irregular, semi-rigid structure, occlude much water, especially if the

[3] After completion of this paper Buzagh published a paper on "The Adhesion of Microscopic Particles" (*J. Phys. Chem.*, Nov., 1939). Buzagh gives an example illustrating the above statement; gelatine increases the adhesion of quartz particles; yet the stability is improved. However it must be noted that quartz in water has a particularly low adhesion (.3 dyn/cm^2).

particles are not spherical and, therefore, occupy a greater volume. The arrangement of the particles in the dispersed and the flocculated sediment may be compared to the piling of bricks—thrown together at random in the case of the flocculated sediment and laid orderly together as in a brick wall in the case of the dispersed sediment.

These tests are best carried out in calibrated graduates with ground glass stoppers, for example in 10 cc. graduates with 1/10 cc. divisions. Usually, good results will be obtained by using 0.25 cc. of the pigment with 9.75 cc. of the water containing the dispersing agent. Care must be taken that all graduates are shaken in the same manner and for an equal length of time; otherwise the results will not be reliable or reproducible.

This method allows a fairly good comparison of the efficiency of different dispersing agents and also indicates rather accurately the least amount of dispersing agent required to obtain maximum dispersion.

Consistency

If a flocculated system is characterized by a large volume of sedimentation and a high amount of mechanically occluded water, it follows that the act of dispersing a flocculated suspension must be accompanied by strong liquefaction. It will always be found that systems of the consistency of flocculated, filter pressed, stiff pulp become liquid upon the addition of effective dispersing agents. Thus a much higher concentration of pigment can be obtained when a dispersing agent is used. As a rule it can be said that the better the dispersion, the higher will be the concentration of pigment obtainable at a certain consistency—although this statement does not always hold at extremely high concentrations.

Outward Appearance

Flocculated pastes exhibit flat, dull, and rough surfaces; while dispersed suspensions or pastes produce a glossy and perfectly smooth film. Furthermore flocculated pigments tend to form pastes, showing definite yield values over a very broad range of concentration; while dispersed systems will flow even at high concentrations.

(To be concluded)

New Tire Warranty

THE following is a new warranty recently adopted by tire manufacturers to apply to tires used in non-highway or off-the-road operations, where they are subject to abnormal or unusually severe service conditions.

Standard Warranty Covering Tires Used in Off-the-Road Service, Also Airplane, Industrial, and All-Solid Tires

The Standard Warranty is as follows:

"Every tire of our manufacture, bearing our name and serial number, used wholly or in part in non-highway or off-the-road service, such as earth moving, grading, excavating, quarrying, stripping, logging, graveling, lumbering, farm service, agriculture (including airplane, industrial pneumatic, and solid tires), when used on rims conforming to the Tire & Rim Association standards, is warranted by us against defects in materials and workmanship.

"If our examination shows that any tire has failed because of such defect we will either repair the tire or make a reasonable allowance on the purchase of a new tire."

The interpretation of this warranty as applied to such products (tires or tubes) by all manufacturers is as follows:

"When tires used in non-highway or off-the-road service, such as earth moving, grading, excavating, quarrying, stripping, logging, graveling, lumbering, farm service, agriculture (including airplane, industrial pneumatic, and solid tires), fail prematurely due to some imperfection in workmanship or material, the manufacturer will assume his responsibility as outlined in the warranty.

"When such a tire is presented to the manufacturer for consideration, the manufacturer will determine the amount of service still remaining in the tire and the normal expectancy of the tire, which means the amount of service it would have given if it had not proved defective, and then figure the price of a new tire accordingly.

"In figuring the replacement price the proportion of normal expectancy will be computed in fractions of ⅛, ¼, ⅓, ½, ⅔, ¾, etc.

"For example—when a defective tire shows by its general condition that it has given about ½ the service it would have given had it not proved defective, the owner will be entitled to a new tire of the same size and type at one-half price.

"The question naturally arises as to how to arrive at the exact proportion of total service such a tire has given at the time of failure.

"This will be determined by taking into consideration various factors such as—condition of bead, cord body, sidewall, tread wear, operating conditions, and the equipment on which the tire in question was used.

"Then, in figuring the adjustment price, consideration will be given to the amount of service the tire actually gave as against the amount of service the tire would reasonably be expected to give had the tire not proved defective.

"As in the case of automotive tires, when any part of such a tire fails, after it has given a reasonable amount of service, without regard to the condition of the other parts, that tire may be properly considered worn out.

"Tires which are removed from service because of cuts or other injuries are not subject to adjustment consideration under this interpretation. This also applies to tires used on rims which do not conform to the current recommendations of The Tire & Rim Association, Inc.

"The above shall be the only basis for adjustment and no other guarantees or warranties, specific or implied, will be recognized by the tire manufacturer. Under no conditions shall such tires or tubes be warranted for any period of service, either hours, months, mileage, or otherwise."

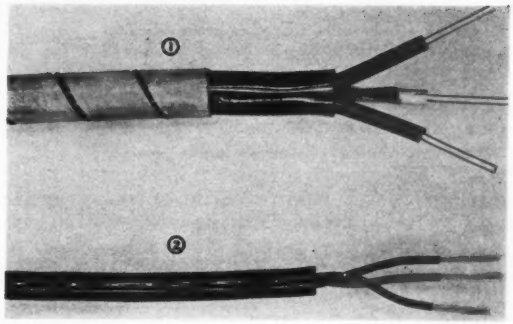
TIRE MANUFACTURERS DIVISION,
THE RUBBER MANUFACTURERS ASSOCIATION, INC.

Action of Latex on Aluminum

Latex films are sometimes used to protect the polished surfaces of metallic mirrors and similar articles while in storage or shipment. Commercial latex, when applied to polished aluminum, produces a bluish discoloration which remains after the latex film is stripped off. The discoloration, according to tests made at the National Bureau of Standards, is caused, not by the rubber, but by the ammonia in the latex. Ammonia-free latex such as that preserved by formaldehyde does not discolor aluminum.

Koroseal, a Raw Material for the Rubber Industry

S. L. Brous[1]



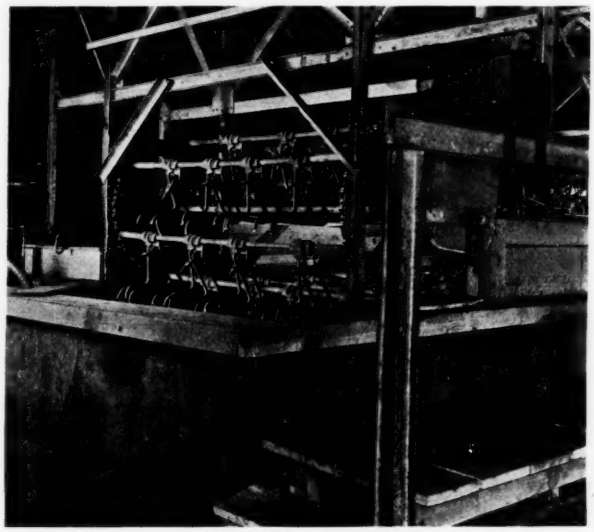
General Electric Co.

Koroseal Cables: (1) Oil Well Pump Lead with Koroseal Insulation and Jacket and Steel Taped Armor; (2) Rayon Spinning Motor Lead with Koroseal Insulation and Jacket

ALTHOUGH ample crude rubber production capacity appears to exist, American manufacturers of rubber products will, for the duration of the war, be faced with the possibility of curtailed delivery in this country. Because of the resulting interest in possible substitute materials this article, which discusses and illustrates some applications of Koroseal, may serve to indicate one source of remedy in case an emergency should arise.—*Editor's Note.*

EXISTING situations involving world powers emphasize more strongly than ever the need of national self-sufficiency. Of primary importance in our defense and industrial life are some of those necessary raw materials and supplies on which we depend normally on foreign sources. Not by any means the least of these is rubber.

Depending, as we must, on ocean traffic for a continuous flow of this elemental material to say nothing of the potential economic situations, it is only reasonable that strenuous efforts would be made to develop substitute or supplemental products based on our domestic resources. Impetus has been added to the already intriguing problem by discoveries which show beyond doubt that not only could useful rubber-like products be synthesized from readily available and potentially cheap raw materials, but also that the new products exhibit properties which indicate their superiority over the natural rubber for a great number of uses. The extent to which these new products have been developed is indicated by estimates that, in any great national emergency, the United States could become completely independent of foreign-grown rubber in only one year by the expenditure of $30,000,000 on a high-speed research program.



Koroseal-Lined and Brick-Sheathed Tank and Conveyer Hooks Covered with Koroseal Tubing

Koroseal, a product of research in the laboratories of The B. F. Goodrich Co. and derived from domestic raw materials, is one of these newer commodities. Available in a wide variety of compositions and, in general, capable of being processed on standard rubber manufacturing equipment, the product is finding ready acceptance by engineers in a large number of industries, particularly where modern requirements are such that older materials will not serve adequately.

A comprehensive outline of the properties of Koroseal was given in an earlier publication.[2] No repetition in this article is necessary except insofar as outstanding characteristics may influence the adaptation in new uses or effect the possible substitution of the new synthetic for rubber.

In the field of chemical and allied industries a goodly portion of process equipment must be protected both inside and outside against corrosives. The chemical inertness of Koroseal suggested its use for this purpose. Investigation showed it to be not only satisfactory, but actually advantageous, and particularly so where rubber admittedly will not serve, such as in contact with strong oxidizing agents. A good example of this application is found in the stainless steel industry where mixtures of nitric and hydrofluoric acids are used for pickling. These acids would quickly destroy rubber, but have no effect on Koroseal. Obviously, for milder services Koroseal could also be substituted for rubber. Several methods are used to protect vessels with Koroseal. In certain uses, such as the outside of pickling tanks and covers for such tanks, it has been found sufficient to use painted or sprayed coats of Koroseal cements. For more severe service sheet Koroseal is bonded to the metal or an impregnated fabric is adhered to the metal and then covered with several coats of Koroseal from solution.

In the electrical wire and cable industry huge quantities of rubber are used for insulating and sheathing purposes. For such services Koroseal has already replaced a large percentage. Applied either by direct extrusion or taping and heat sealing processes, the material is readily adaptable to standard practice.

Koroseal has high dielectric strength, complete resistance to ozone and corona cutting, good insulation resistance, and can be produced with low power factors and dielectric constants. It has good moisture resistance as is evidenced by the fact that insulation resistance and dielectric strength remain stable during continuous im-

[1] Sales engineer, synthetics division, B. F. Goodrich Co., Akron, O.
[2] Fritz and Brous, INDIA RUBBER WORLD, March 1, 1938, pp. 41-42, 46.

mersion in water. Koroseal is resistant to acids, alkalies, and light. It does not swell in oil or common hydrocarbon solvents. That the material is one of permanence is shown by long-time accelerated aging tests. Of primary importance is its resistance to flame propagation—Koroseal does not support combustion. With all of these useful and important characteristics it is believed that displacement of rubber in the electrical industry will continue at an increasing rate even without any emergency situation involving the natural product.

For use in protective wearing apparel and fabrics for lighter and heavier-than-air craft, Koroseal becomes a strategic material. Tested against mustard gas penetration, the product is shown to be superior to the best rubber compounds. Koroseal treated fabrics have been proved many times more resistant to hydrogen gas diffusion than are rubber coated fabrics.

In the field generally known as "mechanical rubber products" there is apparently no end to the possibilities and desirabilities for substitution or replacement of rubber. For instance, actual walking tests on Koroseal heels and soles have shown at least double the wearing qualities of best grades of rubber compositions. Made in a complete range of bright and pastel colors, Koroseal will afford a valuable improvement in all types of footwear. For the petroleum industry Koroseal covered pipelines have already extended the service life in so-called "hot spots" by six times. For high vacuum technique Koroseal offers gaskets and tubing which are flexible and unchanging with age. In the beverage and food industries engineers are using the product in an ever-increasing number of applications, gaining thereby not only decreased maintenance costs on equipment, but also improved products. Typical of such are beverage tubing and container sealing gaskets.

With the number of rubber items currently being manufactured in excess of 35,000, it is hopeless to attempt more than a short summary of the possible substitutions which might be made by Koroseal. Obviously, the extent of actual replacement will depend on world emergency or economic situations which may arise. On the other hand, because of its unique combination of physical, chemical, and electrical characteristics, Koroseal will find extended uses just as rapidly as development and test engineers can make the necessary adjustments and secure the required service data.

Covering "Hot Spots" of Petroleum Pipelines with Koroseal

Okonite Co.

Wires and Cables Utilizing Koroseal: (1) Control Cable with Koroseal Insulation and Sheath and Flameproof Braid; (2) Generator Lead with Varnished Cambric Insulation, Lead Sheath, and Koroseal Cover; (3) High Voltage Power Cable with Oil Impregnated Paper Insulation, Shielding Tape, and Koroseal Sheath; (4) Power Cable with Koroseal Jacket; (5) Control Cable with Felted Asbestos Insulation and Koroseal Jacket; (6) Switchboard or Building Wire with Single Insulating and Protective Covering of Koroseal; (7) Control Cable with Colored Koroseal Insulation and Flameproof Braid; (8) Battery Lead with Koroseal Insulation and Mechanical Protection in Single Covering

Latex Floor Coverings

SUPERTEX plastic latex compounds[1] have been successfully used in the formation of decorative floor coverings and adhesive sub-floorings. The compounds are based on a specially treated latex to which are added certain prepared powders.

Supertex adheres firmly to wood, concrete, asphalt, stone, or metal surfaces to provide a jointless, dustless, and non-slip surface. The spreading in all cases is done by trowel in one coating operation, and the floor is ready for use 24 hours after application. Floorings made with Supertex are said to possess sufficient resilience to absorb sound and vibration. Decorative terrazzo-type floors can be made by incorporating in the mix colored chips of marble, wood, rubber, or cork.

These latex compounds have been used to cover all types of floors in public buildings, shops, offices, etc. Special Supertex compounds have been developed for application to steel ship decks; these are light in weight, afford protection against corrosion, and are sufficiently resilient to accommodate the material to the normal movement of decks without cracking. These compounds are also suitable for filling joints and leveling deck irregularities. A number of bathrooms in the recently-constructed liner, "Dominion Monarch," have been laid with Supertex containing marble chips to produce a terrazzo finish.

Other applications involving the use of these latex compounds include: protection of metal from rust; lining of coal chutes to prevent rapid wear; and covering cow stalls to provide a warm, insulated, waterproof floor which prevents udder chill, damaged hocks, and bruised knees on the cattle.

[1] Products of The North British Rubber Co., Ltd., Castle Mills, Edinburgh, 3, Scotland.

By-Laws Enacted by Rubber Division, A.C.S.

AT THE business session on September 15, 1939, of the Division of Rubber Chemistry, American Chemical Society, held during the fall meeting of the society in Boston, Mass., a new set of by-laws was adopted by the division. After presentation by C. W. Christensen, chairman of the committee previously appointed for the purpose, and clarification through discussion the division membership present voted unanimously to adopt the by-laws which are published herewith in the complete form.

BE IT RESOLVED, by the vote of two-thirds of the Members present at the annual meeting of The Division of Rubber Chemistry of the American Chemical Society (hereinafter called "The Division"), held this 15th day of September, 1939, in the City of Boston, State of Massachusetts, that:

1. These By-Laws of The Division are subject to the Constitution and By-Laws of the American Chemical Society and supersede all motions, rules and by-laws of any nature whatsoever previously enacted by The Division which are in conflict herewith.

2. CLASSES OF MEMBERSHIP. The Membership of The Division shall comprise:

A. Members. Any member of the American Chemical Society may become a Member of The Division on payment of the annual dues of two dollars and fifty cents ($2.50). Only Members shall have the right to vote and hold office. Each Member shall receive *Rubber Chemistry and Technology* without additional cost, except that Members living outside of the United States shall pay mailing charges as prescribed by the Treasurer.

B. Associate Members. Any person may become an Associate Member on payment of annual dues of five dollars ($5.00). Associate Members are not members of the American Chemical Society and are entitled to none of its other privileges. They shall not be eligible to vote or hold office. Each Associate Member shall receive *Rubber Chemistry and Technology* without additional cost, except that Associate Members living outside of the United States shall pay mailing charges as prescribed by the Treasurer.

3. SUBSCRIPTIONS. Libraries and companies may subscribe to *Rubber Chemistry and Technology* at the rate of five dollars ($5.00) per year. Mailing charges shall be prescribed by the Treasurer for those libraries and companies outside of the United States.

Members of all classes shall be automatically dropped from the Membership rolls and subscriptions shall be terminated unless dues and subscriptions, respectively, are paid in full by February 20, of each year.

4. OFFICERS. The Officers of The Division shall be the Chairman, Vice Chairman, Secretary, Sergeant-at-Arms, and Treasurer (although one person may hold the office of Secretary and Treasurer), whose duties shall be those ordinarily performed by such officials, and shall include the duties hereby delegated to the respective officials, and such duties as may from time to time be delegated to them.

The Executive Committee shall have the authority to fill any vacancy which may occur in any Office, including Directors.

The Secretary shall arrange the program for each meeting. Not less than ninety (90) days prior to each annual meeting, the Secretary shall mail to all Members of whatever class, an announcement of the time and place of the coming meeting.

The Treasurer shall deposit the funds of The Division only in banks and securities approved by the Executive Committee. The Treasurer shall be bonded for an amount determined from time to time by the Executive Committee.

5. EXECUTIVE COMMITTEE. There shall be an Executive Committee consisting of the Officers, the Editor of *Rubber Chemistry and Technology*, the Advertising Manager of *Rubber Chemistry and Technology* and five (5) Directors. The duties of the Executive Committee shall be as herein provided and as hereafter determined by The Division from time to time, and they shall perform the duties and assume the responsibilities ordinarily associated with such a committee.

The Officers of The Division shall be the Officers of the Executive Committee.

Each Director shall have the privilege of nominating one alternate, who is a Member of The Division, to represent him throughout any meeting of the Executive Committee, subject to the approval of the Chairman.

The Executive Committee shall meet at least twice each year. Meetings shall be held at the time and place of The Division meetings except that the meetings of the Executive Committee shall precede the meetings of The Division.

Seven (7) members of the Executive Committee shall constitute a quorum.

6. ELECTIONS. All elections shall be by secret ballot. The Chairman shall not be eligible for election for the ensuing year.

Three of the five Directors shall be elected by The Division for a term of one year, starting at the close of the annual meeting at which the election is held. The outgoing Chairman and the defeated nominee for Vice Chairman receiving next to the largest number of votes for that office shall be Directors for the ensuing year. No Director shall be eligible for re-election as a Director for the ensuing year. Each Member shall vote for not more than three (3) nominees for Director. The three nominees for Director receiving the largest number of votes shall be declared elected. In the event of an indecisive vote because of a tie, those nominees receiving the same number of votes shall be voted upon until the tie is removed.

After receiving the Report of the Nominating Committee, the Chairman shall call for nominations, from the floor.

In the event The Division does not hold a fall meeting, or no quorum is present at such meeting, the Executive Committee shall provide for a mail ballot.

7. *RUBBER CHEMISTRY AND TECHNOLOGY.* *Rubber Chemistry and Technology* (hereinafter referred to as "The Journal") shall be published by The Division.

The Editor and Advertising Manager shall be appointed by the Chairman, subject to the approval of the elected Members of the Executive Committee. Any such action shall be effective for no longer than one year, and each shall serve until his successor is appointed.

The Editor shall publish The Journal from time to time during the year, in the name of The Division. He shall submit a budget for the following half of the calendar year to the Treasurer in writing, at least thirty (30) days before each regular meeting of the Executive Committee, and the Treasurer shall send copies of the same to each Member of said Committee before the meeting.

The Advertising Manager shall submit an estimate of the revenue to be expected during the following half of the calendar year to the Treasurer in writing at least thirty (30) days before each regular meeting of the Executive Committee, and the Treasurer shall send copies of the same to each Member of said Committee before the meeting.

The Editor and Advertising Manager shall absent themselves from Executive Committee meetings during discussions of the respective appointments of the Editor and Advertising Manager of The Journal.

The Division shall neither publish nor sponsor any other publication except on the approval of the Executive Committee and under the terms prescribed by them.

8. BUDGET. Ten days prior to each regular meeting of the Executive Committee, the Treasurer shall submit to each Member of the Committee, a proposed budget covering all contemplated expenditures for the following half of the calendar year.

The Executive Committee at each regular meeting shall adopt a budget for The Division for the following half of the calendar year.

The Treasurer shall pay out no funds of The Division in excess of said budget until ten (10) days after mailing notification to each member of the Executive Committee of the fact that the budget is to be exceeded, and no funds shall be paid in excess of the budget in the event that the Treasurer receives a written protest from three (3) members of the Executive Committee within ten (10) days of the date of said mailing, exclusive of Saturdays, Sundays, national holidays, and the date of mailing.

9. MEETINGS. Regular meetings of The Division shall be held at the times and places specified by the National Society unless otherwise determined by the Executive Committee. The annual meeting of The Division shall be in the fall of the year.

Fifty (50) Members shall constitute a quorum for any business meeting of The Division except that no election shall be held unless one hundred (100) Members are present.

10. APPOINTED COMMITTEES. The Chairman shall appoint the following committees, and such other committees as from time to time he may deem best. These committees shall report at the annual meeting of The Division unless otherwise provided.

A. Nominating Committee. A Nominating Committee of five (5) Members shall be appointed at least sixty (60) days prior to the annual meeting. This committee shall select at least one nominee for each office to be voted on at the coming meeting, and at least two nominees for Vice Chairman.

B. Auditing Committee. An Auditing Committee of three (3) Members shall be appointed who shall make an annual audit of the books of The Division.

C. Membership Committee. A Membership Committee of at least fifteen (15) Members shall be appointed.

D. Crude Rubber Committee. A Crude Rubber Committee of at least five (5) Members shall be appointed to study problems relating to control and use of crude rubber and latex and problems related thereto.

E. Nomenclature Committee. A Nomenclature Committee of at least five (5) Members shall be appointed to consider and make recommendations to The Division relative to naming of materials, and terminology used by the Rubber Industry.

11. PLANNING COMMITTEE. The Planning Committee shall comprise the Chairman, the out-going Chairman, the Vice Chairman, the Secretary, and such Members as the Chairman shall appoint thereto. The Vice Chairman shall be chairman of this committee.

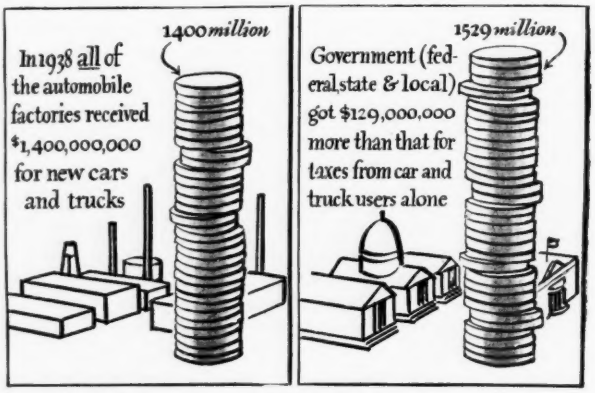
The committee shall make recommendations for future meetings and programs, symposiums, special programs, etc., such as will increase the value of The Division to its Members, the American Chemical Society, and the public. At any meeting of The Division the Committee may submit for adoption a plan for any future meeting.

12. FISCAL YEAR. The fiscal year of The Division shall end December 31.

13. RESPONSIBILITY. The Division is not responsible for statements and opinions advanced by individuals in papers, or discussions before its meeting.

No contract or agreement is binding on The Division unless approved by the Executive Committee.

14. AMENDMENT OF BY-LAWS. These By-Laws shall be amended only by a two-thirds (⅔) vote of the Members present at any regular meeting of The Division on recommendation of the Executive Committee. Amendments may be proposed by any Member by submission in writing to the Secretary, and when so submitted the Secretary shall refer said amendment to the Executive Committee. The Executive Committee shall consider same and make recommendations to The Division at its next regular meeting.


1400 million
In 1938 all of the automobile factories received $1,400,000,000 for new cars and trucks
1529 million
Government (federal, state & local) got $129,000,000 more than that for taxes from car and truck users alone

Automobile Facts

Motor Tax Exceeds Value of New Cars

Electrical Operation of Tread-Cutting Conveyer System

C. W. Drake[1]

ACCURATE cutting of tread stock for automobile tires presents a serious engineering problem. If a tread is cut a trifle too long or too short, the result would be an unbalanced tire; this would be both undesirable and unsafe in these days of high-speed driving. Consequently it is frequently necessary to trim or recut the treads to dimensions, requiring extra time and expense.

In a newly designed conveyer system the hot rubber, after it has left the dies of the tubing machine, is weighed while in motion, thoroughly cooled in water showers, and delivered in a continuous strip to the cutting machine. Continuity of this processing is achieved through the use of a suitable conveyer system. To meet various manufacturing conditions a speed range of the entire system of about four to one is desired as is also the ability to obtain fine adjustments in speed in order to maintain the desired weight of stock. For any one manufacturing condition, all of the conveyers, except the last or cutter conveyer, operate at practically constant speed; while the cutter conveyer starts and stops for each cut. As with any moving vehicle, it is impossible to come to an accurate stop from any maximum speed without first slowing down to a fixed low speed; consequently in the present case the measuring relay must provide for a definite slow speed a short interval before the stop is made.

When making from 10 to 15 cuts per minute the starting and stopping currents taken by the motor driving the cutter conveyer might cause speed and weight variations in the remainder of the system. So a variable-voltage drive with two generators is employed, one generator supplying all of the motors operating at uniform speed and the other supplying the motor for the cutter belt only. Synchronous relation between the various conveyer sections is obtained by specially designed dancer rheostats. Operation of the rheostats is governed by the weight of the loop of rubber tread between the various conveyers. Since the cutter belt stops while each cut is made and its average speed must equal that of the other belts, it is evident that its maximum speed must be much higher. This speed is also determined and regulated by a dancer rheostat controlled by the loop between the last two conveyer sections. The cutting of the rubber is performed by alternating-current motors properly interlocked with the direct-current drive so that the cutter operation is initiated at the same time that the conveyer belt stops and that the conveyer starts again as soon as the cut is completed.

This system provides remarkably accurate cutting, 60-inch tread being repeatedly cut to within ⅛-inch in length. This does not represent the ultimate accuracy of this scheme; the limitation at present is in the measuring device.

The electrical equipment for one of these conveyer systems consists essentially of the following: one four-unit motor generator set consisting of an alternating-current driving motor, a direct-current generator for uniformly moving conveyers, a direct-current generator for cutter conveyer, and a direct-current constant-voltage exciter; one direct-current motor for each independent conveyer section; and complete variable voltage control equipment with auxiliary devices.

Four-Unit Motor Generator Set and Control

The four-unit motor generator set and control, shown in the photograph, is for such a variable-voltage tread conveyer system in a rubber mill. The larger generator, located under the control cabinet, supplies power to four variable voltage motors which may operate over a four to one speed range; while the smaller generator on the left side of the induction motor supplies power to the motor running the cutter belt. At the extreme left end of the motor generator set is the exciter which supplies constant-voltage direct current for the excitation of all direct-current generators, direct-current motors for the control circuit, and dynamic braking of the induction motor driving the cutter carriage.

Owing to the rapid cycle duty and frequent operation of the cutter belt motor, special windings are used on these machines to provide rapid acceleration and deceleration, and the control is obtained entirely by operation of the field circuits, the armatures of the two machines being permanently connected together. Various modifications of this cutting system are possible such as arrangements for cutting in either direction or both directions across the conveyer, and the great accuracy in cutting obtained by this method which is determined primarily by the accuracy of the measuring devices will, it is believed, make the scheme desirable or adaptable for other operations than tread cutting.

[1] Manager, General Mill Section, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

EDITORIALS

Christmas Greetings

WITH this issue which precedes the year-end holiday period, INDIA RUBBER WORLD and its staff extend to its readers a sincere wish that the Christmas Season may bring to them a full measure of enjoyment. To those who may not yet have benefited from the present upward trend in business conditions we trust that the momentum already gained will carry this movement on to a well-founded and extended period of prosperity which will not be subjected to the usual reactions from a war-time inflation. At present the general situation is very encouraging particularly in view of the absence of a desire for an artificial boom, but rather a tendency to look beyond the present regrettable world condition. Aside from those who must suffer in the immediate war areas, prospects are that a truly Merry Christmas and a Prosperous New Year may be realized.

Worn Tires a Safety Hazard

THE rubber tires on passenger automobiles, trucks, motorcycles, etc., form the connecting link between the road surface and a power driven vehicle which, when out of control, becomes an instrument of destruction. The menace, not only to the occupants, but to others, which exists when a motor vehicle is operated on unsafe tires, is being recognized more fully as time passes. This trend is evidenced by the recent actions of civic and other groups of safety-minded individuals.

Circular D 7-1939 entitled "American Standard Inspection Requirements for Motor Vehicles" sponsored by the American Association of Motor Vehicle Administrators and the National Conservation Bureau and approved August 16, 1939, by the American Standards Association, makes definite recommendations in Section 3 on page 23 according to the following quotation.

"PNEUMATIC TIRES. Tires shall be checked by visual examination and any one of the following defects shall be cause for rejection:

"(a) When the wear on any one or more tires at any part is excessive as indicated in items 1, 2, and 3 following: (1) Passenger cars (including motorcycles). When the first outer body ply of cord is exposed. (2) Buses. When the first outer body ply of cords is exposed on the tread. (3) Commercial vehicles (including trailers). When cords of outer body ply of tire having not more than 4 body plies is exposed. For heavier tires, when worn through one-half of the number of plies in excess of four (4). . . .

"(b) Bulges. When temporary repairs are made by the use of blowout patches or boots. Repairs must be permanent.

"(c) When there are tread cuts or snags in excess of one inch in any direction as measured on the outside of the tire, and deep enough to expose the body cords, or when side-wall scuff, cuts or snags which have damaged the body cords."

A Pennsylvania state law effective September 1, 1939, states: "It shall be unlawful for any person to operate a vehicle on the highways with tires showing breaker strip, custom gum or fabrics;" and if within 48 hours after notification by a police officer of defective tires the motorist has not replaced them with good ones, he is liable to a fine of $10 and costs or, failing to pay this, five days in jail.

Also records show that 90% of the punctures and other tire troubles are experienced in the last 10% of tire life.

The average American does not like to be legislated into a regulated life. However if he fails to correct a situation which endangers not only his own life, but the lives of others, the natural outcome is the enactment of laws to force compliance with safe procedure. This growing trend toward recognition of the importance of safe tires and toward the elimination of such hazards may well be heeded by the motorists who can make unnecessary any further legislation in this direction and at the same time protect themselves by eliminating these unsafe conditions.

Rest Periods in Industry

AN ENGLISH management research group recently made a report of a study of rest pauses for workers in Britain, showing that the plan is in common use, but has seldom been introduced as the result of scientific study. The value of rest pauses in work, the report says, has produced substantial evidence to prove the merit of the idea.

Rest periods of from five to twenty minutes for workers, in both the morning and afternoon, are allowed, and employes are given the opportunity to obtain light refreshments. The good effects noted for both employer and employe include: improvement in accuracy in handling equipment and materials; elimination of surreptitious eating during operating periods; reduction of time lost from unauthorized rest periods; improved employe morale and good will; reduction in accident proneness.

As a medium for improving quality as well as quantity production, regular rest periods are effective in the case of unrelated workers, but even more so in many modern practices where sequential operations emphasize the interdependence of unit operators. The benefits of organized rest periods in industry are such that this practice merits the consideration of every employer.

EDITOR

What the Rubber Chemists Are Doing

A.C.S. ACTIVITIES

Rubber Division Plans for Spring Meeting

THE Spring meeting of the Division of Rubber Chemistry, A.C.S., will be held in conjunction with the American Chemical Society's meeting in Cincinnati, O., April 8 to 12. E. B. Curtis, division chairman, has announced that all those who contemplate presenting papers at this meeting should notify H. I. Cramer, division secretary, University of Akron, Akron, O., before December 22, stating the subject of the paper. The deadline for receipt of actual papers by Dr. Cramer has been set for February 15, 1940.

To stimulate membership enrollment in the division, Mr. Curtis has appointed a membership committee, as provided for in the newly adopted by-laws of the division, headed by C. R. Haynes, Binney & Smith Co., 41 E. 42nd St., New York, N. Y. The purpose of this committee will be to inform those in the rubber industry of the benefits to be derived from active association with the division and to encourage men to join both the Division of Rubber Chemistry and the American Chemical Society or the division alone as associate members. The committee comprises, in addition to Mr. Haynes, the following men: F. H. Amon (Cabot), J. M. Ball (Vanderbilt), C. A. Bartle (DuPont), A. E. Boss (Columbia Alkali), A. I. Brandt (Philadelphia Rubber Works), T. Bulifant (Barrett), R. E. Casey (Naugatuck Chemical), C. W. Christensen (Monsanto), I. Drogin (Huber), A. C. Eide (American Zinc Sales), C. P. Hall (C. P. Hall), Wm. Higgins (United Carbon), Carl Minnig (Continental Carbon), J. H. Nesbit (U. S. Rubber Reclaiming), H. E. Outcault (St. Joseph Lead), Carl R. Shaffer (Xylos), B. R. Silver (New Jersey Zinc), Fred Traflet (Pequanoc), G. K. Trimble (Midwest Rubber Reclaiming); and Carl Wright (General Atlas Carbon).

November Meeting of Los Angeles Group

ON NOVEMBER 7 the Los Angeles Group, Rubber Division, A.C.S., met at the Mayfair Hotel, Los Angeles, Calif., with 71 present. During dinner A. D. McPherson, of The B. F. Goodrich Co., announced that the group president, Garvin A. Drew, of A. Schrader's Son, was to be transferred east by his company and, in behalf of the group, presented him with a book, "Big Game Fishing," autographed by members present.

A committee to propose nominations for the election of officers at the meeting on December 5 was named as follows: P. Drew (Goodyear); A. Pond (U. S. Rubber); and E. Royal (H. M. Royal). An auditing committee, comprising R. Behrman (U. S. Rubber), L. McDonald (Goodrich), and M. Montgomery (Martin, Hoyt & Milne) was appointed to make the annual audit of the treasury books. A new set of by-laws for the group, prepared by the executive committee, will be presented for final action at the December meeting. That the August fishing trip had been operated at a profit was reported by W. C. Holmes, who also announced that Bob Carlock would speak on "America First" at the December meeting.

The first feature on the evening's program was a talk on "Recent Developments in the Rubber Industry," by Charles Roese, head of the Goodyear Tire & Rubber Co.'s technical department on the coast. Mr. Roese covered such developments as: the use of rayon, improvements in carbon black, rubber in plastics manufacture, Pliolite and Plioform, synthetic rubber, and the use of extremely long belt lines. In discussing special-purpose tires, he gave details regarding the snow cruiser to be used by Admiral Byrd in the antarctic. A motion picture, "Approved by the Underwriters," was shown by H. G. Ufer, western superintendent of Underwriters' Laboratories, Inc. The film depicted the extensive tests behind the Underwriters labels. E. Royal then showed a colored movie taken on the group's fishing trip in August.

As door prizes, an electric ship's clock, donated by Binney & Smith Co. through its representative, M. Montgomery, was won by R. D. Bonham (Goodrich) and a set of book ends, given by The National Standards Co., through L. O. Smith, was won by R. M. Rockhoff (Firestone). A special prize, an electric razor, donated by the Rubbercraft Corp., through R. Newell, was won by David Good (U. S. Rubber).

At the October meeting the door prize, a portable radio, and special prize, a Toastmaster set, which were given by W. C. Hardesty Co. and American Turpentine & Tar, respectively, were donated through B. E. Daugherty, representative of both firms. At the same meeting, Charles Churchill, local representative of H. Muehlstein & Co., sponsored four prizes of six golf balls each.

Akron Group Sees Cabot Film

THE fall meeting of the Akron Group, Rubber Division, A.C.S., held at the Akron City Club on November 3, proved very interesting with 248 present, among them a number of guests from the East including E. B. Curtis, of R. T. Vanderbilt Co., New York, N. Y.; and chairman of the Rubber Division, A.C.S.; E. R. Bridgwater, E. I. du Pont de Nemours & Co., Inc.; E. Billings, Jr., C. W. Bloom, and Boyd Britton, all of Godfrey L. Cabot, Inc., Boston, Mass.; Carl Wright, of the General Atlas Carbon Co., New York; and B. B. Wilson, of INDIA RUBBER WORLD, who is also secretary-treasurer of the New York Group.

The meeting was preceded by an excellent dinner during which entertainment was provided by the Co-Ed Orchestra, a local group of girls with real ability.

The feature of the program was the presentation of the sound film "Inside the Flame," which illustrates and describes the various processes connected with the manufacture of carbon black. It was prepared and presented by Godfrey L. Cabot, Inc.

The evening was brought to a close with a very interesting talk by Clair A. Dietrich, who told of his experiences on voyages with Admiral Byrd to both the North and South poles.

Chicago Group Hears Talk on Machinery Drives

AT A meeting on November 10, at the Hotel Sherman, Chicago, Ill., members and guests of the Chicago Group, Rubber Division, A.C.S., heard H. F. Weber, district manager, Positive Drive Division, Link Belt Co., Chicago, speak on "Modern Positive Drives for Rubber Machinery." Mr. Weber displayed actual equipment in demonstrating the different types of drives. An excellent floor show provided entertainment during dinner.

Three Papers and Movie on Boston Group Program

THE Boston Group, Rubber Division, A.C.S., will hold its next meeting on December 8 at the University Club, 40 Trinity Place, Boston, Mass. A dinner of steak or lobster will be served at 6.30 p.m. On the program will be the three prize-winning papers of the recent New York Group Essay Contest, and Godfrey L. Cabot, Inc.'s sound film on carbon black, "Inside the Flame." Officers for the coming year will be elected, and in keeping with the approaching Christmas season, prizes to lucky ticket holders will be awarded.

New York Group to Hold Christmas Party December 15

THE annual Christmas party of the New York Group, Rubber Division, A.C.S., will be held on Friday, December 15, at the clubrooms of the Building Trades Employers' Association, 2 Park Ave., New York, N. Y. The eve-

ning's events will begin at 6:30 p.m. when dinner will be served. Major features of the party will be the distribution of gifts and a program of entertainment. As at last year's party, no technical papers will be presented. Tickets are $2.50 for members and $3.50 for non-members; reservations may be obtained from B. B. Wilson, India Rubber World, 420 Lexington Ave., New York, N. Y.

Notes

Sidney M. Cadwell, director of development, tire division, United States Rubber Co., Detroit, Mich., has been named a candidate for president-elect for 1941 of the American Chemical Society. Elections are held by mail.

The Memphis Section, A.C.S., will hold a meeting at Park View Hotel, Memphis, Tenn., December 14, at which A. E. Warner, of C. P. Hall Co., Akron, O., will discuss "Big Things from Little Beginnings in the Rubber Industry."

Awarded Gibbs Medal

The Chicago Section, A.C.S., has presented the 1940 Willard Gibbs Medal to Dr. Vladimir N. Ipatieff, professor emeritus of Northwestern University, where he directs research in catalytic high-pressure syntheses, and director of chemical reasearch in the Riverside, Ill., laboratories of the Universal Oil Products Co. The Russian scientist, who came to this country in 1931, is internationally known for chemical discoveries basic to petroleum refining and to the organic synthesis of artificial rubber and many other industrial products. In 1897 in the laboratory of Prof. Adolf von Bayer, Dr. Ipatieff synthesized for the first time isoprene, building stone of the complex rubber molecule, thus making possible the later synthesis of artificial rubber.

S. C. I. Medalist

The Chemical Industry Medal for 1939 was presented on November 10 to Dr. Robert E. Wilson, president of Pan American Petroleum & Transport Co., at a joint meeting of the American Section of the Society of Chemical Industry, the New York sections of the American Chemical Society and of the American Institute of Chemical Engineers, held at The Chemists' Club, 52 E. 41st St., New York, N. Y. The medal is awarded annually for valuable application of chemical research to industry.

Chemical Show Opens December 4

The Seventeenth Exposition of Chemical Industries, to be held at the Grand Central Palace, New York, N. Y., will open on Monday, December 4, at 2 p.m. and continue through Saturday, December 9. The exposition hours will be 11 a.m. to 10 p.m. with the exception of Wednesday and Saturday when the closing time will be 6 p.m. This extensive display arranged for the benefit of business executives, chemists, and chemical engineers will cover: chemicals and chemical products; plant equipment; laboratory equipment and supplies; instruments; metals and alloys; containers and packaging equipment; and materials handling equipment. Many of the displays will be of interest to those concerned with manufacturing and technical problems in the rubber industry.

Canadian Rubber Section Meets

The Rubber Section, Canadian Chemical Association, was scheduled to meet on November 24 at University of Toronto, Toronto, Ont., Canada, with Bertrand Robinson, district manager, Hardinge Co., Inc., Toronto, speaking on "An Outline of Canadian Mining and Milling Methods."

Sprayed "Thiokol" Powder Protects Metal

A new powdered "Thiokol" can be sprayed on metal to form a continuous and adherent protective coating. The spraying of this powder is made possible by the Schori gun. As compressed air shoots the powder through the gun, a gas flame fuses the material, thus permitting it to flow together on the metal surface to form a protective coating. Work now in progress indicates that this film will be resistant to oils, greases, and many acids and solvents.

The Schori gun, originally developed in Belgium, was first used to spray powdered metals in the formation of protective coatings.

Plasticized Resin Sheets

Calendered sheets, colorless or in transparent opaque colors, are made from plasticized Vinylite resins, suitably plasticized copolymers of vinyl chloride and vinyl acetate. The new sheet materials are flexible, withstanding folding and repeated flexing. Elongations up to 250% with a tensile strength of 3,000 pounds per square inch are obtained. Exhibiting interesting elastic properties, the sheets, when stretched appreciably, return slowly to their original dimensions. The amount of plasticizer incorporated in the resin influences the degree of elasticity.

The new materials are made in thicknesses ranging from 0.003-inch up and in essentially continuous lengths. Properties claimed for the plasticized sheets include: non-oxidizing and non-cracking; unaffected by mold and mildew; resistant to water and perspiration; and, depending upon the plasticizers used, highly resistant to oils, greases, gasoline, and alcohol. Thermoplastic, the sheets can be embossed when hot and heat-sealed at about 140° C.

Plasticized resin sheets have been produced for the manufacture of men's belts, wrist watch straps, garters, and similar articles. Previously, unplasticized sheets have been in production for such uses as book bindings, radio dials, and price tag holders.

Rubber Lubricant

Rubber automotive parts that may cause squeaks or other annoying noises are effectively lubricated by a colloidal-graphite-containing lubricant known as Ruglyde. Said to be highly hygroscopic, Ruglyde furnishes a film which retains its "wetness" and lubricating qualities over long periods. The colloidal graphite in the mixture penetrates the rubber pores and presents a surface which is effective in counteracting friction. Ruglyde, it is claimed, is highly penetrating, non-inflammable, non-volatile, and harmless to rubber, metals, or auto finishes.

Flexible Finish for Rubber

A new rapid drying type of synthetic finish, prepared from a special lacquer formula, is said to produce a waterproof, flexible, glossy finish when applied to rubber, leather, paper, and linoleum. Application can be by spraying, calendering, or embossing. The material is made in a variety of colors as well as in clear solutions. Average coverage after reduction to spraying consistency is approximately 1,000 square feet per gallon.

Protectives for Molds against Rust

Rust-Ban products, coatings for preventing rust, cover a wide range of types and are divided into four principal classifications: non-drying coatings often referred to as "slushing type" products; hard-drying transparent coatings; hard-drying aluminum coatings; and miscellaneous coatings, most of which are essentially permanent in nature and include bituminous materials and primers. Of especial interest are the non-drying grades which can be removed easily from metal surfaces with the ordinary petroleum solvents. Thus they can be used for protecting rubber molds against rust when not in use.

Good luck is the willing handmaid of upright, energetic character and conscientious pursuance of duty. *James Russell Lowell.*

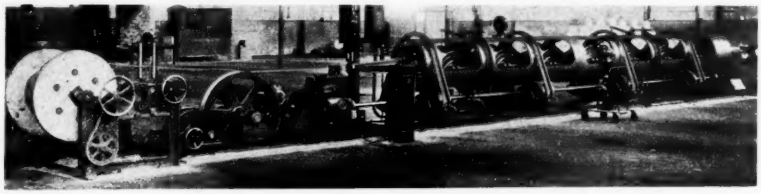
New Machines and Appliances

Wire Stranding Machine

ONE of the interesting new additions to the modern equipment for the wire and rubber industries is the tube-type high-speed stranding machine illustrated herewith. This strander is equipped with variable speed haul-off which eliminates the changing of gears. The machine is equipped with a device which prepares each individual wire for smooth laying, thus eliminating the use of additional accessory units.

The changing from right lay to left lay requires only the shifting of a lever, and electric brakes of the latest type add much to the efficiency of operation. The changing of lay lengths is accomplished in a very short interval.

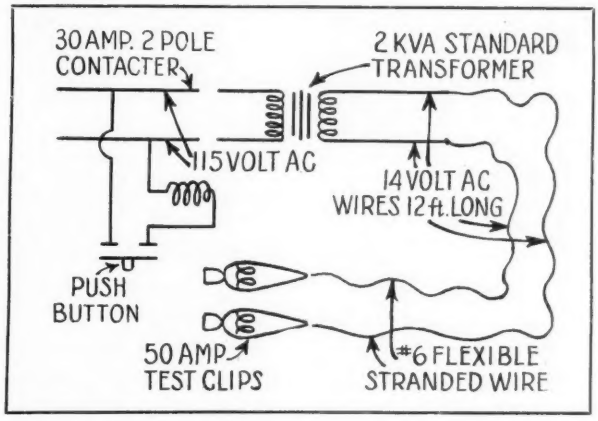
This strander is equipped with ball bearings throughout, has improved tube rollers, special alloy wire guides, and quick acting bobbin latches and bobbin brakes. It is built for 9-, 12-, 16-, and 22-inch standard bobbins. National Rubber Machinery Co., Akron, O.



Model 40 Wire Strander

Aid to Rubber Bale Opening

THE attached sketch is offered in explanation of a suggested method of extracting embedded metal bands from rubber bales by means of electrical heating. A 110-volt circuit is fed through a contactor switch operated by a push button. The circuit is stepped down by means of a 2 KVA standard transformer and is conducted through flexible leads to test clips. These test clips are fastened into the ends of the wires which are to be withdrawn from the rubber, and after 15 to 20 seconds the clips are removed and the wires may be withdrawn from the rubber by pliers or other suitable pulling apparatus. This suggestion and sketch were originally submitted to the National Safety Council by H. A. Walker, safety director, The Goodyear Tire & Rubber Co., Akron, O., for promoting safety in manual operations. Another rubber company suggested to the safety council that the same results could be obtained by using an electric welder in place of the transformer.

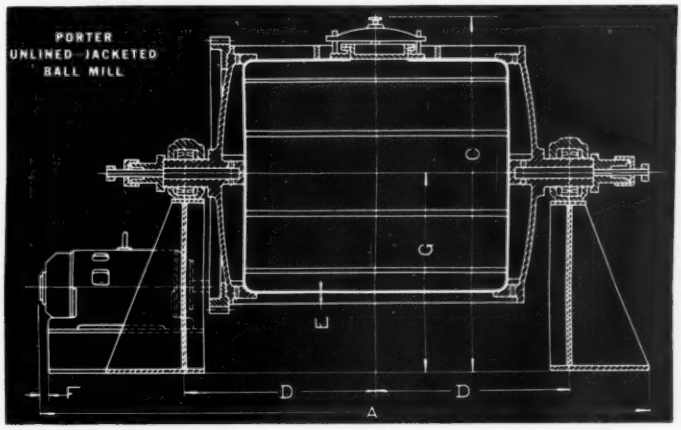

30 AMP. 2 POLE CONTACTER
2 KVA STANDARD TRANSFORMER
115 VOLT AC
14 VOLT AC WIRES 12 ft. LONG
PUSH BUTTON
50 AMP. TEST CLIPS
#6 FLEXIBLE STRANDED WIRE

Electrical Hookup for Removing Bands from Crude Rubber Bales

Ball Mills

BALL mills adapted for the grinding of latex compounding materials include lined and unlined, jacketed and unjacketed equipment. The mills are supported on self-alining S.K.F. roller bearings and utilize oversize gear reduction units. The motor base and the mill stands are built into one solid welded unit.

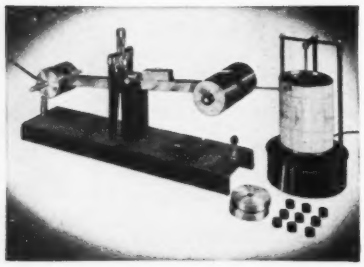
The jacketed feature is of importance in certain types of work requiring temperature control of the material being ground. Referring to the outline drawing which shows an unlined jacketed mill, it will be noted that the cooling liquid is brought in through a jacketed joint to the head of the mill. From here the cooling medium is evenly distributed by baffle plates over the head, each alternate baffle having an opening near the hub and the others at the outer ends. From the head end the liquid passes into the jacket proper and then into the opposite head end from which it is discharged through the centrally located trunnion. This system provides a mill body which is entirely surrounded by the cooling medium. The addition of temperature control apparatus in the water line will act to provide more accurate control of mill temperature. H. K. Porter Co., Inc.



Aminco-Yerzley Oscillograph

THE Aminco-Yerzley oscillograph[1] is used for determining certain mechanical properties of rubber and rubber-like materials as a basis for the evaluation of these materials as vibration absorbers. It may be used to measure: (1) static characteristics—loading and unloading, creep under a given dead load, and set; (2) dynamic

[1] For a full discussion of the construction and use of this oscillograph see "A New Oscillograph for Routine Tests of Rubber and Rubber-like Materials," by Felix L. Yerzley, INDIA RUBBER WORLD, July 1, 1939, pp. 43-47.



Oscillograph for Evaluating Vibration Absorbing Characteristics

characteristics—energy absorption during impact loading, resilience, and effective dynamic modulus. The oscillograph is complete in itself and provides an autographic record in a few minutes from which can be evaluated the properties mentioned above. The instrument can be used also an an auxiliary to a fatigue machine to evaluate a test piece periodically throughout the duration of a life test. American Instrument Co.

Packaging Machine

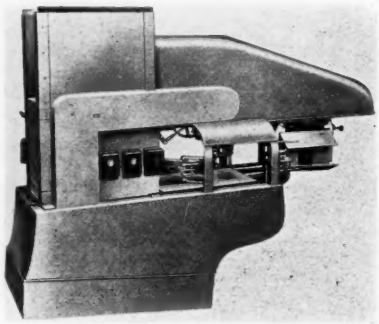
THE Packomatic Commander, an automatic machine for opening knocked-down cartons prior to packing, delivers the cartons, one at a time, from the bottom of a stack in the magazine; opens the container; closes the inner and outer bottom flaps; and places the container in front of the loading horn of a casing machine or in front of an operator for hand packing. All operations are entirely automatic with the exception of replenishing the supply of containers in the magazine. The machine will open 15 or more cartons per minute and will accommodate any type of knocked-down container—solid fiber, corrugated, and taped or stitched lap. The present machine handles only one size of container, but it is expected development in the near future will provide adjustability for various sizes. Construction features include: stainless steel shafting, ball bearings, ball bearing cam rolls, brass cam yokes, roller and block chain, and synchronized control. J. L. Ferguson Co.

New Timer Promotes Efficient Curing

THE Taylor 112R precision set variable speed timer, when applied to vulcanizers such as tire presses and platen presses, is said to make possible the exact overall timing of the cure and the exact sequence of the various steps and functions of the cure. Seven standard gear ratios provide seven ranges of time adjustment, for each of which there are 80 different speeds of cam revolution. Adjusting the timer from one speed to another can be readily done by hand. Closed mercury switches are used to eliminate open contacts. These switches are connected to solenoid air pilot valves of the lock-in type so that in case of electrical failure during cure, the valve will not change position. Unfavorable mechanical elements eliminated by the new timer are: air pistons, over-running clutches, friction drives, and limit switches.

Installation of the new instrument, it is claimed, will speed up production, standardize quality, and step up efficiency. The exact timing achieved with the new unit makes it possible to adjust the work load for greatest operating efficiency. Taylor Instrument Cos., Rochester, N. Y.

Electrical Timer



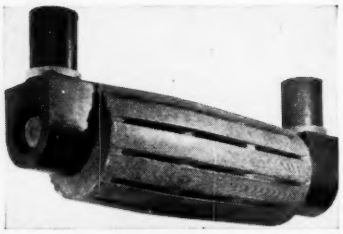
Packomatic Commander

Taylor Curing Timer

Electrical Time Switch

THE Type S403A Timer has been designed to control the operation of electrical equipment where the current supply is to be turned off after a predetermined interval of time ranging from one-half hour to eleven hours. At the end of the predetermined period, to which the instrument has been set by a knob on the front panel, the timer will automatically break the circuit. If necessary, the current may be turned off before elapse of the time interval merely by twisting the knob counterclockwise.

The Con-Tac-Tor mercury switch is of such design that leveling by sight is sufficient when installing. The instrument is arranged for mounting on a standard switch outlet box with concealed or exposed wiring and is adaptable to old or new installations. The timer is suitable for controlling electrical equipment with a non-inductive load of 10 amperes at 110 volts, five amperes at 220 volts, or motors of ¼, ½, or 1 h.p., either with a 110- or 220-volt rating. Minneapolis-Honeywell Regulator Co.



Gatke Acid Resisting Roller and Bearing Assembly after 11 Months of Service

Acid Resisting Bearings and Rollers

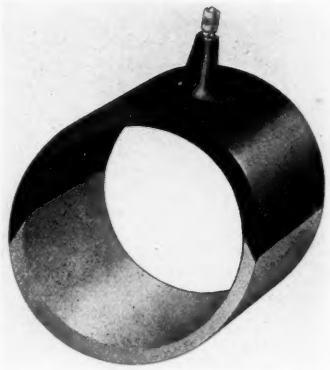
NON-METALLIC acid resisting bearings and rollers made of phenolic materials are reported to be giving excellent service in electrolytic pickling tanks. The accompanying photograph shows an assembly after 11 months of service submerged in hot dilute sulphuric acid and subjected to the effects of iron sulphates, electrolytic action, as well as mechanical wear. Gatke Corp.

Quick-Drying Red Lead Paint

FOR many years red lead has been the standard priming paint used on all metal structures because of its high rust inhibitive qualities. It has been widely used with linseed oil which has necessitated several days for drying before a body and finish coat could be applied.

Not so generally known, though, is the introduction of a quick-drying red lead paint having a synthetic resin as a vehicle. While having all the favorable properties of the old-time red lead and linseed oil, this paint permits drying in a few hours so that two coats may be applied in one day. For application on iron and steel surfaces, the new quick-drying red lead may be applied either by brush or spray. Self-leveling, the film is said to be of uniform thickness and to dry to a hard, firm, smooth surface that will hold any paint applied over it.

New Goods and Specialties



Cross-Section of Heavy Duty Tu-Tone Tube

Two Rubber Stocks Used in Inner Tube

NOW available is a heavy-duty inner tube made of two different rubber stocks, each of which performs a special function in service. The tread portion is composed of a red elastic stock that, it is claimed, retains air for a long time and also can withstand continual flexing. The base of the tube consists of a tough, black rubber stock to insure maximum protection against bead and rim chafing. The Goodyear Tire & Rubber Co.

Wet Weather Suits

PROTECTIVE garments for wet weather service are made of Ute cloth, a double-texture fabric with a solid sheet of rubber vulcanized between the fabric elements. The new garments, suitable for many outdoor industrial activities, feature: a detachable hood which affords head and neck protection; hookless fastener with a protecting flap; and elastic wrist bands. Ute garments are made in two styles, one- and two-piece suits. Industrial Products Co.

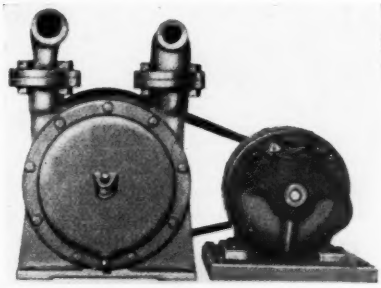
Rubber Tube Utilized by Novel Pump

THE Huber vacuum-pressure pump for handling corrosive fluids, liquid foods, and many other types of liquids utilizes, as a main element in its construction, a tubing made from rubber or acid-resisting synthetic materials, depending upon the material to be pumped. As a high vacuum can be obtained through its operation, the pump can also be used for gases, and it is said to have a potential application for handling rubber latex.

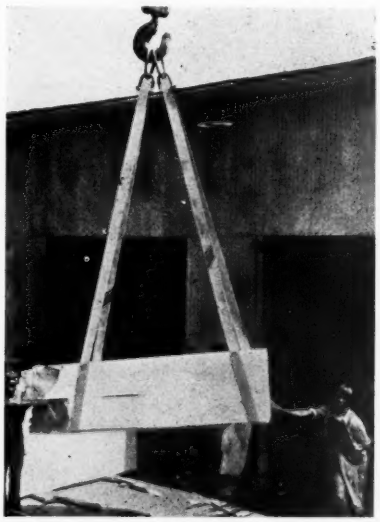
The rubber tubing fits along the circumference of the bore of the casing,

Ute Wet Weather Suit

being fastened at its intake end by a bushing and at its discharge end by a combination bushing and check valve. An off-center rotor radially pushes a compressor ring against the tube to close it firmly, this action moving along from intake to discharge side. As the compressor ring releases the tube, it expands back to its normal diameter,



Huber Vacuum-Pressure Pump



Moretti-Harrah Marble Co., Sylacauga, Ala., Uses Goodrich Four-Inch, Four-Ply Highflex Endless Belts 24 Feet Long as Slings for Handling Marble Blocks Weighing up to 10,000 Pounds

Hewitt Oil-Resistant Belting Installation

producing a high vacuum. The liquid or gas is thus sucked into the tube and discharged with each revolution of the drive shaft.

The design is such that the liquid going through the pump does not come in contact with any of the metal parts. There is practically no wear on the internal moving parts, and an occasional replacement of tubing is the only maintenance required. A lift of 30 feet and a pressure of 100 pounds per square inch can be developed. Pump sizes are such that capacities of from 1/10-gallon to 50 gallons per minute can be obtained. Huber Pump Co.

All-Neoprene Transmission Belting

TO MEET the demand for belting that will withstand the destructive action of mineral oils, a new type of transmission belting has been developed, utilizing Neoprene throughout in both friction and skim compounds. Previously only outside plies were impregnated with Neoprene compounds. The exclusive use of this synthetic rubber is said to provide, where oil comes in contact with the belting, protection against ply separation, softening, and wear of the cotton duck. Hewitt Rubber Corp.

Lightweight Bicycle Tire

THE airflight is a lightweight bicycle tire 26- by 1¼-inch of narrow cross-section, designed to fit the lightweight bicycles which are now gaining the popularity in this country that they have had in Europe for many years. Despite its light weight, the new tire is said to be of sturdy construction and to have a specially designed rib tread to hold the road. On one side of the tire the sidewall is corrugated for driving a generator to supply current for the headlight. Fisk Tire Co.

UNITED STATES

Business Maintains High Production Rate

INDUSTRIAL activity is the greatest in a decade. The rush of new business has eased somewhat, but indications are that with orders now on hand plants will be busy for a few months, at least. Activity in 1940 will depend upon the movement of finished goods during early months. Although inventories are increasing, no real overstocking is apparent. Employment and payrolls are the highest since late in 1936, and further gains are anticipated although labor disputes are spreading. Some industries report a shortage of skilled workers.

Much buying for plant improvement is noted. Department stores, mail order houses, and chains find sales reaching 1937 levels. Tin plate mills, running at 96% of capacity in a contraseasonal upturn, expect to maintain this level for some time, to make fourth-quarter output a record. The oil industry's unexpected improvement also should last several weeks. Cotton mill output, with its seasonal peak, was the highest in two years, and wool goods mills remain near top levels of the year. Machine tool production continues the steady rise begun in January. Furniture factories report an unusual increase; while lumber output has dropped less than seasonally. Carloadings, which seasonally declined somewhat in November, are better than a year ago. Footwear has entered a period of seasonal decline. But for labor trouble, automobile production would have hit a new high this season. Most dealers report low stocks of both new and used cars, and 1940 models are selling well. A backlog of steel orders sent ingot production up to 94% of capacity, the highest in ten years, with tonnage a record figure, but orders are now coming more slowly. Much current purchasing is for consumption, not stock.

The rubber industry is enjoying excellent business, and crude consumption in October reached a new high. Manufacturers believe a relative rate will be held for some time. Suppliers of equipment and ingredients as well as reclaim and scrap dealers report very good trade. Although some easing up of replacement tire business may be expected during the winter, it is hoped that original equipment will take up the slack.

EASTERN AND SOUTHERN

Carbon Black Bombs for Antarctic Aerial Photography

To assist in claiming rights to the Antarctic for the United States, a large quantity of uncompressed carbon black has been donated to the Byrd expedition by the Continental Carbon Co., 295 Madison Ave., New York, N. Y., it was announced by C. R. Johnson, technical director of that firm. Packed in air-tight tins, the carbon black was loaded upon the *North Star*, supply ship for Admiral Byrd's expedition, which left Boston on November 16 for the Antarctic. During the long winter nights members of the expedition will make the carbon black into bombs.

Both the plane carried atop the huge snow cruiser and the planes at Little America will be used in the photographing. Every few miles, just prior to taking a photograph, a bomb will be released, and exploded by light detonators, resulting in a large black splotch on the snow. The black spots in the pictures will provide an accurate and quick method of identification to expedite piecing the photos together to form the map. Spotting of the ice and snow fields in this manner is necessary because there are practically no landmarks to identify a particular area.

Loading Carbon Black aboard the *North Star*, Antarctic Supply Ship

The details for this interesting and novel use for carbon black were worked out by Mr. Johnson in conjunction with Dr. Thomas C. Poulter, of the Research Foundation of Armour Institute of Technology, Chicago, Ill.

Vulcanized Rubber Co., Morrisville, Pa., reports increased production and personnel.

CALENDAR

Dec. 4-8.	American Society of Mechanical Engineers. Hotel Bellevue-Stratford, Philadelphia.
Dec. 4-9.	17th Exposition of Chemical Industries. Grand Central Palace, New York.
Dec. 5.	Los Angeles Rubber Group. Mayfair Hotel.
Dec. 8.	Boston Rubber Group. University Club.
Dec. 11-16.	Motor & Equipment Manufacturers Assn. Annual Convention in conjunction with the 1939 Joint Trade Show and Automotive Service Industries Show. Chicago, Ill.
Dec. 15.	Detroit Rubber Group. Christmas Party. Webster Hall, Detroit.
Dec. 15.	New York Rubber Group. Christmas Party. Building Employers' Trade Association, 2 Park Ave.
Jan. 12.	Society of Chemical Industry. Perkin Medal Award. Chemists' Club, 52 E. 41st St., New York.
Jan. 15-19.	Society of Automotive Engineers. Annual Meeting. Book-Cadillac Hotel, Detroit.
Mar. 4-8.	American Society for Testing Materials. Committee Week. (Spring Meeting, Mar. 6). Detroit.
Apr. 8-12.	American Chemical Society. Spring Meeting. Cincinnati.

N. B. M. A. Elects

National Battery Manufacturers Association, Inc., 7 E. 44th St., New York, N. Y., held its fifteenth annual convention at Sherman Hotel, Chicago, Ill., October 24 and 25, when the following officers and directors were elected for the ensuing year: president, L. B. F. Raycroft, Electric Storage Battery Co., New York; first vice president, B. F. Morris, Thomas A. Edison, Inc., Kearny, N. J.; second vice president, E. T. Foote, Globe-Union, Inc., Milwaukee, Wis., secretary, L. A. Daggett, National Battery Co., St. Paul, Minn.; treasurer, L. A. Doughty, Carlisle & Doughty, Inc., Conshohocken, Pa.; commissioner, V. L. Smithers, Akron, O.; directors, A. J. Baracree, Am-Plus Storage Battery Co., Chicago, F. C. Kroeger, Delco-Remy Division, General Motors Co., Anderson, Ind., J. H. McDuffee, Electric AutoLite Co., Toledo, O., L. N. Talkes Cleveland Storage Battery Co., Cleveland, O., Lester Perrine, Perrine Quality Products Corp., Waltham, Mass., and E. P. Bernardin, Jr., Vitalic Battery Co., Dallas, Tex.

United States Rubber Co., 1790 Broadway, New York, N. Y., has transferred W. J. Laliberte, branch operating manager at Kansas City, to a similar post in Chicago to succeed J. B. Spotswood, who retired from active business on November 30 to live on his farm in Virginia. C. A. Gray, branch operating manager at Buffalo, has been sent to Kansas City. His successor at Buffalo is H. A. Dathe, for the past several years a member of the company's headquarters staff in New York.

Rowe Succeeds Murray at Hagerstown Plant

The Hagerstown Rubber Co., Inc., manufacturer of heels and soles, Hagerstown, Md., through President J. B. Reynolds announced that on December 1, Frederick R. Rowe, for 14½ years factory manager of the O'Sullivan Rubber Co., formerly Victor Products Corp., Gettysburg, Pa., joined the Maryland firm in a similar capacity, taking the place of Richard C. Murray, who resigned to become factory manager of the Beebe Rubber Co., Nashua, N. H. Mr. Rowe, who will also buy the raw materials and supplies in his new position, was associated with the Boston Woven Hose & Rubber Co. before entering the service in 1917. After returning from overseas he was employed as superintendent of the Plymouth Rubber Co. and later the Armstrong Cork Co., Rubber Division. He is married and has a son, Frederick, Jr.

Mr. Murray, a native of New Hampshire, was chemist and factory manager at the O'Sullivan company's Winchester, Va., plant from 1929 to 1933 when he left with Mr. Reynolds to start the Hagerstown concern.

Tingley-Reliance Rubber Corp., manufacturer of molded rubber goods, 903 Ross St., Rahway, N. J., to meet growing business is erecting a new addition to its plant to house the finishing and shipping departments and new offices. The two-story building, 65 by 80 feet, of brick, cinder block, and steel, to cost $6,000, will increase the company's floor space by 10,000 feet and is expected to be completed next month.

W. M. Pierce, chief of research, New Jersey Zinc Co., 160 Front St., New York, N. Y., recently was elected a vice president of the American Institute of Mining and Metallurgical Engineers.

American Automobile Association reported that 90% of the visitors at the recent New York National Automobile Show who were asked were in favor of devoting exclusively for highway purposes state tax collections from gasoline and registration fee levies.

Krebs Pigment & Color Corp. plans a major addition to its plant at Edge Moor, Del., to provide additional production capacity for titanium dioxide and extended titanium pigments. Construction work will begin with the new year, to be completed in early fall.

O'Sullivan Rubber Co., Inc., 511 Fifth Ave., New York, N. Y., manufacturer of cements, heels, soles, hose, and molded goods, has, according to President R. J. Funkhouser, enough unfilled orders on hand to keep the plants at Winchester, Va., and Gettysburg, Pa., running at full capacity to the year-end at least.

Rubber Trade Association Elects

Rubber Trade Association of New York, Inc., 95 Broad St., New York, N. Y., on November 9 held its annual meeting at which the following directors were unanimously elected for the ensuing year: Robert Badenhop, A. Bendixsen, Philip Billhardt, Wm. E. Bruyn, Jacobus F. Frank, A. L. Grant, Louis V. Keeler, H. Muehlstein, and D. A. Paterson. These in turn elected Mr. Grant president, Mr. Bruyn vice president, and Mr. Keeler treasurer. B. G. Davy was reappointed secretary-manager of the association.

Tree Surgery School

The Van Yahres School of Tree Surgery and Conservation, Westbury, N. Y., announces in a new brochure its courses on tree preservation. Advanced and beginner courses are offered, including practical training at the school's summer camp near Cooperstown, N. Y., or winter camp in Georgia. The school provides for training in the Van Yahres method of tree cavity filling with rubber[1] which was developed in 1930 after years of research. Up to date, more than 7,000 cavities have been filled by this method with satisfactory results.

Martindell Molding Co., Inc., Trenton, N. J., manufacturer of rubber specialties, now running with three shifts, has employed extra workers. Company officials report no change in hard rubber goods prices.

Puritan Rubber Co., Trenton, N. J., experiencing its busiest season in several years, is operating 24 hours a day with three shifts. Richard Marcus, company executive, has purchased a home in the Hiltonia section of Trenton to which he has moved with his family from Massachusetts.

Thermoid Co., Trenton, has hired more employes and has enough orders on hand, especially for hose and belting, to continue operating 24 hours a day for some time. The company recently let a contract for a two-story warehouse to cost $8,000.

Mercer Rubber Co., Hamilton Square, N. J., operating to capacity, has announced an increase of from 5 to 10% in the cost of mechanical rubber goods.

Whitehead Bros. Rubber Co., Trenton, N. J., will erect a two-story brick addition, 48 by 100 feet, to its plant, and new machinery will be installed. The company is operating with extra shifts.

Pocono Co., Trenton, has enough orders on file to run at capacity through the winter.

[1] For a full discussion of the Van Yahres methods see India Rubber World, Dec. 1, 1937, pp. 47-48, and Sept. 1, 1939, p. 31.

Fire Fighting Laboratory Begins Tour

The Lux Laboratory of Fire Fighting, a new mobile fire demonstration unit sponsored by the Walter Kidde Co., Bloomfield, N. J., staged a spectacular preview demonstration before 300 luncheon guests at the Arrowhead Inn, Henry Hudson Parkway, New York, N. Y., on November 15. The unit, which started a nation-wide tour of hundreds of American cities following the preview, showed how gasoline, oil, and other liquid and electrical fires are quickly smothered with carbon dioxide gas. In fighting fires the Lux equipment lays down a blanket of carbon dioxide or dry-ice snow which readily volatilizes at the base of the flame to cut off the fire's oxygen supply. This type of fire fighting is especially efficient in industry to choke electrical fires in motors, generators, transformers, or in the presence of flammable liquids where water is not suitable.

The United States Labor Department, Washington D. C., in its recent lists of government supply contracts awarded includes the following: CCC: rubber boots: United States Rubber Co., Naugatuck, Conn., $10,480; Navy: cable: Anaconda Wire & Cable Co., New York, N. Y., $23,368, General Electric Co., Schenectady, N. Y., $55,-297, E. B. Latham & Co., New York, $11,190, Okonite Co., Passaic, N. J., $57,593, Rockbestos Products Corp., New Haven, Conn., $45,805, valves: Jenkins Bros., Bridgeport, Conn., $2,323; Procurement: tires and tubes: U. S. Rubber, New York, indefinite amount.

L. Albert & Son, dealer in rubber mill machinery, Trenton, N. J., will shortly erect an office building and warehouse in the Midwest. The company is busy at its Trenton, Akron, and Los Angeles plants and has added more help at each place.

Jos. Stokes Rubber Co. is operating to capacity both its Trenton and Canadian plants. Company officials announce that prices are firm.

Nearpara Rubber Co., Trenton, N. J., is experiencing a busy season producing reclaimed rubber.

Essex Rubber Co., Trenton, N. J., has been rushed for the past two months, with production of soles and heels rising.

Luzerne Rubber Co., Trenton, N. J., enjoyed increased production of hard rubber goods during the past two months.

Pierce-Roberts Rubber Co., Trenton, N. J., manufacturer of druggists' sundries and radio parts, has enough orders on hand to operate to capacity the remainder of the year.

U. S. T. D. C. Promotes Hawkes

U. S. Tire Dealers Corp., 1790 Broadway, New York, N. Y., last month, according to President L. D. Tompkins, elected as a vice president Howard N. Hawkes, for the past several years general sales manager, which post he will retain as well.

Tire Selling Plan Is Success

The Dealer Employe Training Plan, inaugurated a few months ago by the U. S. Tire Dealers Corp. as a means of promoting a more widespread use of approved selling methods among its dealers' sales staffs, is proving successful. According to company officials, the plan, which comprises a series of 20 transcribed "sales casts," presented one each week, is being adopted by more and more dealers throughout the nation. Each 10-minute dramatization is a 12-inch record "broadcast" to the dealers' employes through his own radio with a standard RCA record player supplied to dealers subscribing to the program. Each "sales cast" is a complete unit in itself and is followed by an open-forum discussion in the dealer's place of business. The records serve as an opener for discussion meetings built around a leader's guide which gives brief instructions on how to conduct the discussion. Questions, based on the script, are devised to stimulate definite expressions of opinion from the men.

The flexibility of the plan, company officials point out, also has made it possible for "U. S." salesmen to transport the equipment to smaller markets and conduct the training program before groups of associate dealer employes.

G & J Tire Division Meetings

A review of 1939 operations to date and formulation of merchandising and distribution plans for 1940 featured meetings of G & J Tire Division sales managers held recently at Detroit and Kansas City under the leadership of G. R. McNear, manager of the division. Attending the Detroit meeting were: Thomas Lawrence, New York; P. J. PurDon, Boston; A. L. Stewart, Chicago; Daniel J. Marian, Detroit; and Robert Manoe, Atlanta. Present at the Kansas City gathering were: Harold Noonan, San Francisco; W. B. Pitzer, Oklahoma City; L. T. Kresswell, Kansas City; Benjamin Chapman, Los Angeles; Jack Andrews, Dallas; and Daniel Gaches, St. Louis.

General Electric Co., Schenectady, N. Y., has announced the retirements, effective January 1, 1940, of Owen D. Young and Gerard Swope, chairman of the board and president, respectively, who are leaving because they have passed the 65-years-of-age limit. They will be made honorary chairman and honorary president, respectively. Charles E. Wilson, executive vice president, will succeed Mr. Swope; while Philip D. Reed, assistant to the president, has been named chairman of the board.

Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y., at its recent annual meeting at the Hotel Waldorf-Astoria elected the following directors for three-year terms: E. S. Foyer, president, American Hard Rubber Co., New York; T. W. Miller, chairman of the board, Faultless Rubber Co., Ashland, O.; H. E. Smith, vice president, United States Rubber Co., New York; E. S. Thomas, executive vice president, Goodyear Tire & Rubber Co., Akron, O.; John L. Collyer, president, B. F. Goodrich Co., Akron.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., through President Lammot du Pont, announced that, effective November 22, C. Lalor Burdick, chemist and company executive since 1928, was made assistant to the president, succeeding Henry B. du Pont, who recently was named a vice president and member of the executive committee.

Thomas H. Chilton, director, technical division of the engineering department at du Pont, on November 16 was presented with Columbia University's Charles Frederick Chandler Medal, for his "outstanding achievements in the discovery and formation of principles underlying the unit operation of chemical engineering and in the application of these principles to process development, equipment design and chemical plant construction and operation."

National Association of Waste Material Dealers, Inc., Times Bldg., New York, N. Y., held a well-attended fall convention at the Lord Baltimore Hotel, Baltimore, Md., which emphasized the growing importance of the waste or secondary raw material industry, particularly in view of the present concern over the availability of strategic materials in the event of emergency.

NEW ENGLAND

Texlastik Corp., Central Falls, R. I., recently was incorporated to manufacture covered rubber yarns. Walter S. Stewart is president, and Paul O. Boghossian treasurer.

Wallace C. Hutton, vice president and treasurer, Seamless Rubber Co., Inc., New Haven, Conn., recently was elected a director of the Morris Plan Bank of New Haven. He is also on the boards of the Yale Hope Mission, New Haven Building & Loan Association, and Grace Hospital and is very active in chamber of commerce and Community Chest affairs.

The W. J. Voit Rubber Corp., Los Angeles, Calif., according to W. D. Voit, vice president and sales manager, is now marketing, besides its extensive line of inflated rubber balls, a high-grade tennis ball known as the Voit Aristocrat, made under U. S. L. T. A. specifications and packed three to a pressure-sealed can, four of which comprise a display carton, or, in bulk, 12 balls to a carton.

OHIO

Tire List Prices Reduced

During the last month the three largest tire companies in Akron announced reductions in passenger-tire list prices which amounted to approximately 12.5% on First and Second Line tires. Varying adjustments were made in other lines, most of which carried a decrease of from 3.5 to 12.5%. Goodyear Tire & Rubber Co. started the movement on October 30, making the reduction effective November 1. In explanation of this action Goodyear executives have stated:

"We have placed ourselves in position to make these reductions for tire users by an extensive program of plant modernization and by streamlining our system of distribution. . . .

"Fictitious list prices, from which long discounts have been offered, have been regarded as a major evil in the tire industry over a considerable period. With wholesale prices reduced and dealer discounts readjusted, the new pricing arrangement is expected by Goodyear executives to correct this evil and to re-establish consumer lists on a valid basis."

On November 7, The B. F. Goodrich

On the *North Star*, when she sailed from Boston, November 16 for the first leg of a trip to the Antarctic, was this giant snow cruiser, loaned to the Government by the Research Foundation of Armour Institute of Technology for Admiral Byrd's expedition to the South Pole. The cruiser is equipped with Goodyear tires, 10 feet high, 33.50 inches in cross-section. Airfoam latex sponge mattresses are also part of the equipment.

Co. and the Firestone Tire & Rubber Co. announced that effective November 1 they were meeting the Goodyear proposition except for slight modifications. On October 31 the following statement was received from L. D. Tompkins, president, U. S. Tire Dealers Corp., and vice president, U. S. Rubber Co.: "We recently made some small upward adjustments in prices to conform with higher material costs in order to maintain the high quality of our tires without impairing the welfare of our employes and dealers. We believe car owners are willing and able to pay a fair price for tires of maximum quality and safety."

In the face of factual increases in the price of crude rubber this reduction in tire list prices appears unusual, but if the fluctuation in actual selling price due to special sales can be eliminated and consumer lists made effective, the industry will benefit from the resulting stability.

New Rubber Company Formed

Rubber Products Co., Conneaut, recently was incorporated to manufacture hard and soft rubber goods. Capital stock consists of 100 shares with no par value, and incorporators were Edward J. Malek, president, in charge of sales, Theodore E. Warren, secretary, and Robert W. Whitney, treasurer and plant superintendent, all of whom with W. T. Ross comprise the directorate. The firm leased for two years with purchase option a plant in Conneaut with 10,000 square feet of factory space where machinery was being installed, and production was scheduled to start late in November, with a small office force and eight factory employes, to be increased as business warrants. Mr. Whitney recently resigned from Aetna Rubber Co., Ashtabula, after 12 years there as supervisor, to join the new company; while Mr. Malek for 15 years had been general superintendent and sales engineer at Aetna.

The Akron "Rubber Ball," first held in 1938, this year will be a one-day Mardi Gras on December 2, according to the committee, which plans on city-wide observances to be climaxed by the ball itself at night, for which a well-known orchestra and a court of six prominent men and six ladies in "Akron materials" are promised.

United Air Lines through President W. A. Patterson announced that recently enrolled for membership in the "100,000 Mile Mainliner Club," the exclusive group of air travelers who have flown 100,000 miles or more by commercial transport plane, were a number of men identified with the rubber industry, including: R. W. Albright, of American Anode, Inc., Akron, and T. G. Graham, James J. Newman, and Myron L. Taylor, all of The B. F. Goodrich Co., Akron.

R. P. Dinsmore

W. S. Wolfe

Goodyear Advances Wolfe and Dinsmore; To Build New Pliofilm Factory

President Paul W. Litchfield, of The Goodyear Tire & Rubber Co., Akron, has announced two executive changes involving W. S. Wolfe and R. P. Dinsmore. The former, manager of the development department, has been made factory manager of all the Goodyear factories in the United States and is responsible to Vice President C. Slusser. Mr. Dinsmore, former assistant to the factory manager, is now manager of the development and research departments.

Mr. Wolfe joined Goodyear in 1912 in the experimental department after graduating from Massachusetts Institute of Technology, but later left the company to become vice president of The Seiberling Rubber Co. He returned to Goodyear in 1934 in the tire sales department, was made assistant manager of the truck tire department in 1936, and the following March was appointed manager of the development department.

Mr. Dinsmore was graduated from M. I. T. in 1914, then joined the company in its experimental department, and was made assistant chemist of Goodyear in Canada in 1916, chief chemist, Goodyear, California, in 1919, chief chemist and research director of the Akron factory in 1921, assistant to the factory manager in 1932, and assistant development manager in 1939.

Increased Use of Pliofilm Causes Factory Expansion

The ever-gaining demand for Pliofilm, especially by the packaging industry, has compelled Goodyear to build a new plant, construction of which started November 27, adjacent to the new Goodyear factory for molded rubber goods, also now under construction at St. Mary's, O. All Pliofilm is now being made in the company's Akron factories, where facilities for the product, since it was first sold commercially in March, 1936, have been increased to four master production units running at full capacity. But so great is the demand that a 30-day back-order situation exists in several fields. President Litchfield has announced that when the new $800,000 Pliofilm factory at St. Mary's is in operation, it will immediately increase production facilities 50%. Estimated total Pliofilm production for 1939 is 25,000,000 yards, and the figure for 1940 is anticipated to reach 38,000,000 yards.

With completion of the St. Mary's plant, Pliofilm will have its own complete production and sales organizations, as follows: general production manager, J. P. Maider; production manager of St. Mary's plant, George Lyon; in charge of operating and shipping, at Akron, B. J. Anthis; in general charge of sales, A. F. Landefeld; in charge of packaging sales, A. B. Clunan; in charge of merchandising and sales promotion, E. B. Brewster; New York district representative, William O'Keefe; Chicago district representative, H. L. McCleary; Akron district representative, C. C. Ross; Eastern technical service representative, C. E. Gardner; Western technical service representative, George Brown.

Executives at New Molded Goods Plant

The following comprise the executive personnel at the new factory at St. Mary's, scheduled to start manufacturing molded goods early next month: superintendent, Ian D. Patterson; in charge of production, W. L. Davis; in charge of development, Sam DuPree; personnel manager, L. L. Hackler; engineer, H. J. Fee; operating manager, B. D. Scherer; manager of molded goods sales to dealers, Raymond A. Hudson; molded goods sales to manufacturers, J. D. Berwick.

The Seiberling Latex Products Co., Inc., Akron, reports that advance orders for its new Seiberling line of Walt

(*Continued on page 78*)

MIDWEST

New Movie Depicts Reclaim's Importance

The utility of reclaimed rubber and its importance in a national emergency, involving a shortage of crude rubber, is ably presented in a new moving picture recently produced by the Midwest Rubber Reclaiming Co., East St. Louis, Ill. A fantasy entitled "It Might Happen Here" had its premiere at the Waldorf-Astoria Hotel, New York, on November 10 before a small group as guests of William Welch, president of Midwest. Although intended for showing in schools and libraries, this picture is of interest to the rubber industry as it indicates that the reclaimed rubber industry is well able to handle any requirements of rubber manufacturers. It is a fitting companion to its predecessor, "Rubber Reborn" which also was produced by the Midwest Rubber Reclaiming Co. about two years ago and which has been shown before various groups of the Rubber Division, A.C.S.

N. S. C. Elects Rubber Section Officials and Gives Safety Contest Awards

National Safety Council, Inc., 20 N. Wacker Dr., Chicago, Ill., held its twenty-eighth safety congress and exposition at Atlantic City, N. J., October 16 to 20 at which the following executive committee for the Rubber Section was elected for the year 1939-40: general chairman, R. W. Morse, Firestone Tire & Rubber Co., Akron, O.; vice chairman in charge of program, Oliver Hopkins, United States Rubber Co., Providence, R. I.; secretary, C. W. Ufford, Ohio Rubber Co., Willoughby, O.; *News Letter* editor, Ralph Farnum, U. S. Rubber, Detroit, Mich.; engineering committee chairman, D. G. Welch, Hewitt Rubber Co., Buffalo, N. Y.; health committee, Dr. W. S. Ash, U. S. Rubber, Detroit, Dr. P. A. Davis, Goodyear Tire & Rubber Co., Akron, and Dr. J. N. Shirley, Arrow Mutual Liability Insurance Co., Watertown, Mass., membership committee chairman, John L. Grider, American Hard Rubber Co., Butler, N. J.; publicity committee chairman, R. M. Weimer, Dayton Rubber Mfg. Co., Dayton, O.; statistics committee chairman, G. E. Teal, U. S. Rubber, Naugatuck, Conn.; members at large, J. J. Loge, General Tire & Rubber Co., Akron, Paul Van Cleef, Van Cleef Bros., Chicago, Ill., Wm. Spanton, American Hard Rubber, Akron, C. Pritchard, Ball-Band Plant, Mishawaka, Ind., J. E. Lovas, U. S. Rubber, Passaic, N. J., W. H. MacKay, Dunlop Tire & Rubber Corp., Buffalo, Urban L. Moler, Inland Div., General Motors Corp., Dayton.

Safety Contest Winners

Another feature of the convention was the awarding of prizes to winners of the N.S.C. annual safety contest. Details of the Rubber Section contest follow:

The July 1, 1938, to June 30, 1939, contest had an enrollment of 36 plants which worked 98,385,787 man-hours during the year.

All units, shown below, rated No. 1 received a bronze trophy; all units No. 2 and No. 3 received certificates.

FINAL STANDINGS, JUNE 30, 1939

GROUP A AND B

(Units averaging over 125,000 man-hours per month)

Final Rank	Unit	Man-Hours Worked	Disabling Injuries	Frequency Rate
1.	Goodyear Tire & Rubber Co., Gadsden, Ala.	2,676,927	2	.747
2.	Goodyear, New Toronto, Ont., Canada	2,309,392	2	.866
3.	Dominion Rubber Co., Ltd., Merchants Factory, Kitchener, Ont., Canada	1,580,512	2	1.265
4.	United States Rubber Co., Naugatuck Footwear Plant, Naugatuck, Conn.	8,350,535	12	1.437
5.	Goodyear, England	4,314,114	7	1.623
6.	Dominion Rubber, Dominion Factory, St. Jerome, P. Q., Canada	2,318,157	4	1.726
7.	U. S. Rubber, Los Angeles, Calif.	2,098,230	4	1.906
8.	U. S. Rubber, Providence, R. I.	4,420,558	9	2.036
9.	U. S. Rubber, Indianapolis, Ind.	2,085,670	5	2.397
10.	Goodyear, Java	1,947,440	5	2.567
11.	Goodyear, California	2,182,839	6	2.749
12.	Ball-Band Plant, Mishawaka, Ind.	6,305,628	20	3.172
13.	U. S. Rubber, Passaic, N. J.	3,777,935	12	3.176
14.	Inland Mfg. Division, General Motors Corp., Dayton, O.	3,555,035	14	3.938
15.	U. S. Rubber, Detroit, Mich.	9,654,793	51	5.282
16.	Goodyear, Australia	1,953,000	12	6.144
17.	Goodyear, Jackson, Mich.	1,588,825	11	6.923
18.	Gillette Rubber Co., Eau Claire, Wis.	3,982,557	30	7.533
19.	Goodyear, Akron, O.	17,007,452	201	11.818
20.	Ohio Rubber Co., Willoughby, O.	1,609,710	22	13.667
21.	Pennsylvania Rubber Co., Jeannette, Pa.	1,974,444	33	16.714
22.	Goodyear, Argentina	1,595,862	104	65.169
	R-9	3,340,140*	46	13.772
	Total	90,629,750	614	6.775

*Final report missing—covers eleven months only—not ranked.

GROUP C AND D

(Units averaging 5,000 to 125,000 man-hours per month)

Final Rank	Unit	Man-Hours Worked	Disabling Injuries	Frequency Rate
1.	The Lobl Mfg. Co., Middleboro, Mass.	116,717	0	0
2.	Fabric Fire Hose Co., Sandy Hook, Conn.	85,406	0	0
3.	Dominion Rubber, Papineau Factory, Montreal, P. Q., Canada	1,259,806	1	.794
4.	Goodyear, Windsor, Ont., Canada	1,027,551	2	1.946
5.	Dominion Rubber, Dominion Tire Factory, Kitchener	953,209	2	2.098
6.	Corduroy Rubber Co., Grand Rapids, Mich.	1,074,587	3	2.792
7.	U. S. Rubber, Development Dept., Passaic	267,100	1	3.744
8.	Goodyear, Bowmanville, Canada	783,321	3	3.830
9.	Canadian Lastex, Ltd., Montreal	165,903	1	6.028
10.	Hewitt Rubber Corp., Buffalo, N. Y.	639,266	5	7.821
11.	U. S. Rubber, Bristol, R. I.	1,066,602	9	8.438
12.	U. S. Rubber, Mechanical Fabric Div., Providence, R. I.	121,515	5	41.147
	R-6	195,054†	5	25.634
	Total	7,756,037	37	4.769

Withdrawn: R-41.
†Final report missing—covers eleven months only—not ranked.

1940 Session

Col. John Stilwell, N.S.C. president, has announced that the twenty-ninth annual safety congress and exposition will be held at the Stevens Hotel, Chicago, October 7 to 11, 1940. The program provides for 140 sessions and 500 speakers, and every phase of accident prevention will be covered.

Smooth Tires Are a Winter Hazard

Experiments of the National Safety Council show that inadequate traction is the most dangerous hazard in winter driving and that safe operation of motor vehicles on curves and in stopping or starting depends largely on the friction between tires and road surface. The safety council also reports that traffic death rates increase from 20 to 40% in the winter and that its National Fleet Safety Contest reveals that for the last three years the winter accident rate was 50% higher than the summer rate for these fleets operating throughout the nation.

The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, advises replacement of smooth tires in the fall in the interests of both safety and economy, for tires last about one-third to one-half longer in the winter because they run much cooler and in the winter roads, being wet most of the time, cause less abrasive wear on casings than in dry seasons. Moreover records show that 90% of tire troubles occur in the last 10% of tire life; therefore worn tires are a source of inconvenience in winter.

Gillette Rubber Co., Eau Claire, Wis., which has been operating at capacity for some time, expects its 1939 profits, according to President R. W. Hutchens, to be the highest on record. Employment is being maintained at about 2,700, the best figure in the company's history. Mr. Hutchens also reported the firm's sales usually decline in mid-October, but this year business on hand justifies running the plant at full until January 1 at least.

FINANCIAL

Unless otherwise stated, the results of operations of the following companies are after deductions for operating expenses, normal federal income taxes, depreciation, and other charges, but before provision for federal surtax on undistributed earnings. Most of the figures are subject to final adjustments.

American Cyanamid Co., 30 Rockefeller Plaza, New York, N. Y., and subsidiaries. First nine months, 1939: net income, $3,339,437 after expenses, depreciation, depletion, interest, amortization, provision for income tax, and dividends on subsidiary preferred stock, equal to $1.25 each on 2,618,369 shares of outstanding common stock, after allowing for dividend requirements on 208,910 shares of preferred stock of the parent company, contrasted with net income of $1,400,280, or 53¢ a common share in the corresponding period last year.

Anaconda Wire & Cable Co., New York, N. Y. September quarter: net income, $150,423, equal to 36¢ each on 421,981 capital shares outstanding, against $97,057, or 23¢ a share, in the third quarter last year.

Baldwin Rubber Co., Pontiac, Mich. Year ended September 30: net profit, $334,613, equal to $1.05 each on 316,592 shares of $1 par capital stock, against $19,986 or 6¢ each on 316,757 capital shares in the previous fiscal year.

Belden Mfg. Co., Chicago, Ill., and subsidiaries. Nine months to September 30: net income after including nonrecurring income of $73,748, $228,964, equal to 95¢ a share, against net loss last year of $129,232.

Collins & Aikman Corp., 200 Madison Ave., New York, N. Y., and subsidiaries. Six months to August 26: net profit, $128,657, equal after preferred dividends, to 4¢ each on 562,800 no-par common shares, against net loss of $539,968 for the same period in 1938.

Columbian Carbon Co., 41 E. 42nd St., New York, N. Y., and subsidiaries. First nine months, 1939: net profit, $2,380,330, equal, after deducting $1,363,756, or $2.54 a share, for depreciation and depletion, against $1,118,496, or $2.08 a share, in the 1938 period, to $4.43 a share on 537,406 common shares, against $1,944,458, or $3.62 a share, earned in the first nine months last year; current assets on September 30, $7,456,426, including $3,905,409 in cash and marketable securities at cost, and current liabilities, $864,033, against current assets of $5,841,471, of which $2,711,715 was in cash and marketable securities, and current liabilities, of $910,989 in the corresponding period last year; inventories, $1,684,149, against $1,977,395 a year earlier.

Crown Cork & Seal, Inc., Baltimore, Md., and wholly owned domestic subsidiaries. September quarter: net profit, $831,655, equal after preferred dividend requirements, to $1.36 each on 517,609 common shares, against $604,339, or 92¢ a share in the second quarter and $449,337, or 62¢ a common share in the third quarter of 1938. Nine months to September 30: net profit, $1,627,549, equal to $2.41 a common share, against $1,352,893, or $1.88 a common last year.

Detroit Gasket & Mfg. Co., Detroit, Mich. September quarter: net profit, $80,369, equal after 6% preferred dividend requirements, to 31¢ each on 214,250 shares of common stock, against $113,093 or 46¢ a common share in the second quarter this year and $19,102 or 33¢ each on 57,500 shares of $20 par preferred stock in the third quarter of 1938. Nine months to September 30: net profit, $321,472, or $1.30 a common share, against $14,955 or 26¢ a preferred share last year.

General Motors Corp., Detroit, Mich. Nine months ended September 30: net earnings, $109,619,799, or $2.39 a share for the common stock, against $38,387,707, or 73¢ a share, in the 1938 period.

Link-Belt Co., Chicago, Ill., and subsidiaries. Nine months to September 30: net profit, $957,436, equal after dividend requirements on 6½% preferred stock, to $1.17 each on 684,462 no par common shares, against $703,740 or 81¢ each on 675,573 common shares last year.

Mohawk Rubber Co., Akron, O., and subsidiaries. First nine months, 1939: net income, $293,244, equal to $2.22 each on 132,138 shares, against $219,679 or $1.66 a share last year.

Monsanto Chemical Co., St. Louis, Mo., and subsidiaries. Quarter ended September 30: net profit, $1,296,914 after depreciation, obsolescence, federal income taxes, minority interest, and subsidiary preferred dividends, equal after dividend requirements on the $4.50 preferred stock, to 96¢ each on 1,241,712 shares of common stock, excluding 21,245 shares in the treasury, contrasted with net profit of $1,007,842, or 72¢ a common share in the June quarter and $690,743, or 51¢ a share on the common in the September, 1938, quarter. First nine months of 1939: net profit, $3,514,181, or $2.56 a common share, against $1,853,294, or $1.36 a common share in the 1938 period.

Norwalk Tire & Rubber Co., Norwalk, Conn. Year ended September 30: net profit, $180,592, equal after preferred dividends to 74¢ a share on 202,230 common shares, against $111,195, or 40¢ a share, the preceding fiscal year; gross sales, $3,785,181, against $2,785,865; total income before depreciation, $281,390, against $201,612.

O'Sullivan Rubber Co., Inc., 511 Fifth Ave., New York, N. Y. September quarter: earnings, $46,939, against $20,423 in the corresponding period last year. Nine months to September 30: net profit, $65,502, against net loss of $4,313 last year; earnings for first nine months of 1939, after taxes and provision for dividends on the $500,000 of preferred stock outstanding, equal to 24¢ each on 100,000 shares of unsubordinated common stock outstanding.

Pharis Tire & Rubber Co., Newark, O. Year ended October 31: net profit, $450,000, equal to $2.05 each on 220,000 shares; ten months ended October 31, 1938, net profit; $455,084, or $2.07 a share.

Raybestos-Manhattan, Inc., Passaic, N. J. First nine months, 1939: net income, $1,069,926.95, or $1.69 per share, after providing $526,685.93 for depreciation, and $263,296.84 for federal and state income taxes, against net loss of $57,167.30, after providing $561,504.15 for depreciation, in the corresponding period last year; total assets at September 30, $18,610,298.69, including $9,811,686.78 of current assets, equivalent to nearly nine times the current liabilities; there were no banking or funded debt, or other capital obligations outstanding.

Rome Cable Corp., Rome, N. Y. Third quarter, 1939: net profit, $69,090, equal to 36.7¢ a common share, against $72,075, or 38¢ a share, in the third quarter last year. Six months to September 30: net profit, $115,083, against $61,178 last year, when the second quarter showed a deficit.

Skelly Oil Co., Chicago, Ill. Third quarter, 1939: net income, $609,327, or 52¢ a common share, after all deductions, against $695,180 in the 1938 period. First nine months, 1939: net profit, $1,366,245, or $1.09 a share. Year ended September 30: net profit, $2,042,878, or $1.67 a share.

United Carbon Co., Charleston, W. Va. Nine months to September 30: net profit, $1,107,715, after depreciation, depletion, federal and state income taxes, minority interest, and other charges, equivalent to $2.78 each on the 397,885 shares of no-par common stock, against $1,143,906, or $2.87 a share, in the first nine months last year. Current assets on September 30 were $3,808,703; current liabilities, $927,355, compared with $3,757,361 and $763,735, respectively, in 1938.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Year ended September 30: net profit, $11,909,761 after depreciation, federal income taxes, and other charges, equal, under the participating provisions of the shares, to $4.46 each on the combined 79,974 shares of 7% $50 par preferred and 2,592,155 shares of $50 par common stock, contrasted with net profit of $9,612,711, or $3.60

(*Continued on page 78*)

FROM OUR COLUMNS

50 Years Ago—December, 1889

An idea for a new line of goods for some American manufacturer, is to learn how to make the pure gum strip that the insulated wire men are using on wires. (p. 51)

"I will put up a $5 bill that I will stick rubber better to any shafts by the use of blood than can be possibly done with any acid, or without nothing." (From a letter to the editor. p. 60)

The only mill in the country run on rubber work by the use of natural gas, so far as we know, is that of the Muncie Rubber Co., of Muncie, Ind. (p. 63)

The largest rubber spring that we have any information of is one lately made by the Boston Car Spring Co. It was made of a very nice quality of compounded rubber, was 18 inches in diameter, 21 inches in height, and weighed 302 pounds. (p. 64)

25 Years Ago—December, 1914

It is obviously to the advantage of the Eastern planters and of American manufacturers that rubber should be shipped direct from one to the other, but it is equally obvious that this method would not be looked upon with favor by rubber circles in London. (p. 118)

The opening door of the South American market—which will be likely to open wider with the continuance of the war—will undoubtedly attract not a few American manufacturers, and among them makers of various rubber goods. Their success in this field will be in proportion to the discretion with which it is entered. (p. 118)

Rubber gathered in the dry season has 25% more tensile strength than rubber from the same trees gathered in the wet season. (Reference to plantation rubber. p. 118)

Belgium rubber manufacture began as far back as 1852 . . . A factory was established at Molenbeek St. Jean by Gustave Luyckx, of Brussels. The second factory was founded by an American, Jonathan Gage Stickney, who was born in Beverly, Mass., in 1819. (p. 120)

The shipments of rubber from the (Belgium) Congo began in 1887. (p. 122)

It is stated that the "Emden," the German cruiser which sunk 25 or more merchantmen belonging to the Allies before it was brought to book by the Australian "Sydney," cost the rubber industry about a million dollars. (p. 125)

Victor Henri in 1909-1910 was the first to expose rubber to the ultra-violet rays, carrying out vulcanization with films of solutions of rubber. (p. 130)

The (Young's) Gravitometer, which is now on the market, is the invention of Philip E. Young, of the Acushnet Process Co., New Bedford, Mass. (p. 141)

OBITUARY

Mervin E. Barr

TYPHOID-PNEUMONIA caused the death, on November 1, of Mervin E. Barr, for the past two years superintendent of Division C of the Buitenzorg, Java, plant of The Goodyear Tire & Rubber Co., Akron, O., which he joined in 1927. Starting in the hose room, he went into production control (1930), becoming a squadron foreman (1936), and supervisor of Plant II tires (1937).

Mr. Barr, who was born at Big Run, Pa., July 4, 1908, leaves a wife, a sister, and their parents in Pennsylvania, where the body will be brought for burial.

James A. Murray, Sr.

ON NOVEMBER 10, James Augustus Murray, Sr., died at his home in New Haven, Conn., of a heart attack. He was president and treasurer of Goodyear Rubber Sundries, Inc., New Haven, which he had founded in 1921. He had joined Seamless Rubber Co., Inc., in 1885, in a minor capacity, later becoming foreman, superintendent, and then vice president and general manager before resigning in 1917 to become president and general manager of the National Rubber Co., Pottstown, Pa.

The deceased, who was born in Bristol, Pa., August 16, 1867, and educated in public schools there, was interested in politics and had held several civic posts in New Haven, and at the time of his death had been president of the board of police commissioners since 1930. He also belonged to the Knights of Columbus, Holy Name Society, B.P.O.E., and New Haven Chamber of Commerce.

J. A. Murray, Sr.

Mr. Murray is survived by his wife; a daughter; a son, James, Jr., assistant treasurer, secretary, and general manager of the rubber company; a sister; and four grandchildren.

A solemn high mass of requiem was sung at St. Aedan's Church on November 13. Interment was in St. Lawrance Cemetery, New Haven.

F. R. Wahl

AFTER a long illness Frederick R. Wahl, counsel and assistant secretary, Goodyear Tire & Rubber Co., Akron, O., died at his home there on November 16. He had joined the company as head of the law department in August, 1923, after several years' experience with legal and industrial concerns, and was elected assistant secretary in December, 1924.

Born in Milwaukee, Wis., 47 years ago, he attended the University of Wisconsin, receiving his A. B. in 1913 and his law degree two years later. A captain during the World War, he served as judge advocate on the staff of a major general. Mr. Wahl was prominent in business and social circles and belonged to the Portage Country Club.

He leaves his wife, a son, a daughter, a brother, and two sisters.

Private funeral services were held at his home on November 17. Cremation occurred in Cleveland.

ARGENTINA

The Compania Industrial del Caucho S. A., Velazco, 1385, Buenos Aires, has moved its factory to Intendente Neyer, 686, (U.T. 742-1731), Beccar, (F.C.C.A.), while retaining its office in the federal capital. It is requested that all mail and matters relating to the factory be sent to the new address.

Eduardo A. Olivero, an Argentina aviator, plans during the early part of 1940 a balloon stratosphere flight, the first in the Southern Hemisphere, and is constructing a balloon in which he hopes to reach 97,500 feet, against the present record of 72,394 feet established by two Americans in 1935. The balloon will be 184 feet in diameter, 257 feet high, and equipped with observation instruments. Its aluminum-globe observation cabin will be eight feet in diameter, equipped with parachutes, designed to avoid such a fatal accident as occurred to three Russians in 1934 when the cabin became detached from their balloon.

EUROPE

GREAT BRITAIN

Detel Available in Sheets

For Detel, the chlorinated rubber product invented by F. C. Dyche-Teague and marketed by Detel Products, Ltd., Greenford, is claimed complete resistance at temperatures up to about 150° F., to almost all known organic and inorganic acids, alkalis, and various other substances, as sea water, oxygen, ozone, chlorine, bromine, iodine, potassium cyanide, petroleum and tar fractions, alcohol and methylated spirits. Hitherto it has been available in the form of a solution to be applied like paint to protect various surfaces—steel, iron, plaster, asbestos board, wood, etc., from the effects of weather and various corrosive agents. It is now also obtainable as a soft flexible black sheeting designed to be used for protecting tanks, cylinders, and other equipment, as well as flanges, pipes, and valves. When cut to size and shape, it can be easily attached by a special solvent cement. The sheeting has the advantage over any kind of paint of being completely impervious; besides it is flexible and shock-resistant like rubber. The sheeting also has various uses including the backing for upholstery in theaters, automobiles, steamers, airplanes, etc.

War's Effects

New conditions created by the war are stimulating the production of certain lines of rubber goods and developing new ones, not only for military purposes, but also for civilian use. Thus the rationing of gasoline is increasing the demand for bicycles and necessarily for cycle tires and also for rubber cycle capes and other protective apparel. George Maclellan & Co., Ltd., Maryhill, Glasgow, has introduced an inflatable waterproof camping cape which serves as a pneumatic camp bed.

The distribution of gas masks to the public has given rise to an enormous demand for suitable containers, and various types of waterproof and rubberized styles have already appeared.

A less desirable outcome of the war is the decision to postpone certain sections of the Education Act, 1936, by which the school-leaving age was to have been raised to 15 after September 1, 1939. For the duration of the war, therefore, it is still legal to employ children between 14-15 years old.

The Government has decided to prohibit the assembly of large numbers of people in theaters, moving picture houses, and halls, because of the war. Consequently the British Industries Fair, scheduled for London and Birmingham in February, 1940, has been canceled, also this year's International Shoe & Leather Fair.

The Ministry of Supply has appointed a joint committee for controlling and organizing the production of rubber-proofed cloth garments and ground sheets for government contracts. It is understood that in future all orders for rubber-proofed cloth garments will be placed by the committee on behalf of the Ministry, which will be represented by J. W. Burdett.

Colored Latex to Brighten Sandbags in London

Some of the well-known banks and insurance companies in London are trying to brighten up their palisades of sandbags, now familiar, but grim characteristics of the city's landscape. The latest method is to spray the bags with latex, using for preference the patriotic colors, red and blue, without the white. The colors are reasonably permanent, and the film of latex renders the jute fiber resistant to the effects of the weather and also to the rot-promoting action of fungi usually present in the filling material, especially if this happens to be sour earth taken from the nearest dump. These colored bags are generally piled up rather imposingly at the main entrances to the offices.

About Gloves

Discussing some of the advantages and disadvantages of thin all-rubber gloves in *India Rubber Journal,* Dr. P. Schidrowitz expressed surprise that rubber manufacturers were not more active in placing on the market the thicker, more durable, and more comfortable type of rubber gloves, including those made from rubberized fabric. Some interesting correspondence resulted, and one of those interested submitted a collection of rubberized cotton gloves with knitted wrist bands which, although designed for industrial purposes, were said to find a greater sale for household purposes and gardening. A Neoprene coated glove of the small gauntlet type was also sent.

GERMANY

Imports and Exports

German rubber statistics for the first half of 1939 are now available. From April, 1939, on figures cover Greater Germany (exclusive of the Protectorates Bohemia and Moravia), but prior to October, 1938, they include Austria, but not the Sudeten territory. Taking this into consideration, imports of crude rubber at 492,703, against 484,756 quintals for the 1938 period, show little real change. Imports of waste rubber were 18,007, against 21,237 quintals; while imports of old tires and tubes and parts or waste of such goods declined considerably: old tubes, 9,804 against 13,860 quintals, old tires, 11,178 against 51,692 quintals, and of parts 12,562, against 18,979 quintals.

Exports of rubber goods, especially tires, increased considerably. Automobile tires rose from 92,211 to 169,671; almost all countries participated in this advance, some trebling and even quadrupling their purchases in the 1939 period. Thus Denmark took 30,971, against 13,207 tires; Sweden, 12,089, against 3,114; Yugoslavia, 7,100, against 1,322; Great Britain, 11,596 against 6,072; India, 15,537, against 8,904; and Brazil, 17,678, against 10,682. Exports of automobile tubes were 130,752, against 63,452 units; cycle tires, 1,122,741, against 628,707. The increases in Germany's business with British India is worth noting; it was among the best customers for automobile tires, ranked second as buyer of automobile tubes, and was the heaviest buyer of cycle tires, taking over 40% of the 1939 shipments.

The distribution of rubber footwear exports underwent considerable change in the period under review. The Netherlands, the chief buyer in 1938, cut its share practically in half, putting Sweden in first place, although the latter country had reduced its share by about ⅓, as had Mexico. However these losses were offset by gains elsewhere so that total exports were actually higher than in 1938, that is 134,879, against 125,615 pairs.

Exports of hard rubber goods were 5,665, against 4,150 quintals; hard rubber in sheets, rods, etc., 311, against 258 quintals; and unvulcanized hard rubber dough, 1,251, against 705 quintals.

The Leipzig Fair

The Leipzig Fall Fair was held from August 27 to 31, and exhibitors included Denmark, France, Great Britain, Italy, Japan, Rumania, Sweden, Switzerland, and Hungary. Despite present conditions, the date of the Leipzig Spring Fair has been set for March 3-11, 1940. It is recalled that in the last war too the Leipzig Fair was regularly held. Incidentally it is expected that Russia, which has not participated since 1936, will again be represented and that the fair will be a very important factor in reviving and increasing trade relations with the Soviet.

New Type of Synthetic Rubber

The American Consulate General, Frankfurt a.M., recently reported that a prominent German concern has undertaken the manufacture of a new type of synthetic rubber known as ethylene polysulphide, for which a domestic supply of raw material is avail-

able, and although details are not available, it is understood production will be developed on a large scale. Unlike Buna, which is used mostly for tires, the new synthetic will be utilized for soft rubber goods and is especially recommended for flexible tubing and conduits, for conveying gasoline, benzol, and other liquids, for packing materials, and for printing plates, rollers, etc. Experiments are also in progress on using the new product as a sheathing for metal cables. The new synthetic can be processed by the same machines used for natural rubber. Incidentally, ethylene polysulphide synthetic rubbers have been manufactured in the United States for several years.

Company Notes

I. G. Farbenindustrie, A. G., has increased its capital to 731,000,000 marks by issuing new shares to a value of 11,000,000 marks.

Kabelwerke Rheydt, A.G., reports great activity during the past business year, when two and three shifts were worked. The company again declared a 12% dividend.

EUROPEAN NOTES

Holland

The Netherlands, dependent largely on foreign sources for raw materials, is severely hampered by the hostilities in Europe; so to conserve necessary materials, it has assumed a certain control of various industries which either produce or consume these goods, including rubber and rubber goods products.

In 1938 the Netherlands had 17 rubber factories which consumed 3,260 tons of raw rubber, employed 3,040 persons, and produced goods to a value of 10,200,000 guilders, including 4,282,000 tires and 2,314,000 tubes. These goods were destined chiefly for home consumption; exports represented a value of only 600,000 guilders in 1938.

Italy

By all accounts Italy too is suffering as a result of a shortage of certain raw materials, including cotton and raw rubber, stocks of which were low even before the outbreak of the present war in Europe. Reexports of cotton from Italian ports were prohibited as from September 1. It is also understood that as a result of the reduced supply of crude rubber Pirelli intended to curtail operations considerably in September.

Finland

The Finnish rubber industry in 1938 imported 2,738 tons of raw rubber, gutta percha, and balata, 69 tons of waste and reclaimed rubber, 252 tons of packing, 43 tons belting, 31 tons hose, 836 tons automobile tires, 118 tons cycle and motorcycle tires, and 120 tons footwear. Exports consisted of 190 tons of footwear and 120 tons of belting and other rubber goods.

Hungary

The Hungarian rubber industry progressed favorably in the last few years, but in 1938 foreign business suffered a considerable set-back. Imports of crude rubber were 32,226 quintals, against 36,488 quintals. There was hardly a single export article that did not undergo curtailment, which is easily understood when it is realized that Hungary's chief customers were the neighboring states. Exports of rubber and asbestos goods were 1,002 quintals against 1,556 quintals; belting 646, against 671 quintals; soft rubber mechanical goods, 2,466, against 3,800 quintals; heels and soles, 784, against 1,554 quintals; erasers, 214, against 344 quintals; dipped goods, 1,579, against 2,608 quintals; and toys, 658, against 917 quintals.

The greater part of the imports, from Germany, included 2,817 quintals of automobile tires, against 2,737 quintals, and 761, against 781 quintals of galoshes and snow shoes.

FAR EAST

CEYLON

Standardization of Raw Rubber

The 1938 report of the London Advisory Committee for Rubber Research (Malaya and Ceylon) on standardization of raw rubber states that a subcommittee has been formed to deal with this matter as a result of complaints by manufacturers about difficulties in obtaining raw rubber of uniform quality suitable for their requirements. Inquiry indicated that both British and American rubber manufacturers agreed that rubber should be free from mechanical impurities and mold; it should be of uniform softness (two grades, one soft, and the other hard, but both uniform might be advantageous); the rate of vulcanization should be uniform, and aging should be good. The representatives of manufacturers on the sub-committee pointed out that the range of variation in quality of first-grade rubber is at present so wide that it is possible to find rubber that will be badly undervulcanized under standard conditions; whereas other rubber will cure so rapidly as to set up on the mixing rolls. It was also stated that about 10% of first-grade plantation rubber contained so much sand it was unsuitable for use in the manufacture of tubes.

The sub-committee has decided first to determine the method of fixing tolerances allowable for a standard rubber and to begin by concentrating on vulcanization properties and liability to scorch. The staffs of the committee and of the Research Association of British Rubber Manufacturers are to cooperate in the preparation of detailed methods of testing.

A scheme is also under consideration for identifying, by an official mark, rubber from estates adopting agreed standards of cleanliness.

Shortage of Acetic Acid

Since the outbreak of the war in Europe a shortage has developed in certain estate supplies, including acid for coagulating latex. As a result, prices for these materials and especially for acetic acid have increased abnormally of late.

The Coconut Research Scheme has been conducting experiments to discover the possibilities of manufacturing acetic acid from coconut shell. These tests appear to have been sufficiently successful to encourage the installation of a small plant for the purpose. It seems that a substance containing 9% of acetic acid can be obtained from coconut shell, and it is calculated that roughly 300,000,000 coconut shells, now said to be annually used for charcoal production, would, if passed through distillers instead of being burned in the usual way, yield 27,000 tons of the product containing 9% of acetic acid.

MALAYA

Position of Rubber

"The position of rubber at June 30 is far happier than the most sanguine would have dared to predict six months ago," Fraser & Co. states in its review of Malayan trade for the first half of 1939. "Stocks have declined steadily, thanks to the increasing needs of America which accounted for 274,566 tons of the total world consumption of 525,133 tons."

However, although admitting that the position of rubber appears healthy, Frazer & Co. is skeptical and points out that "all that glitters is not gold." The company fears the high potential output.

"Have the directors of Malayan estates, especially those in England, given sufficient consideration to the budgrafted rubber now maturing in the fertile soils of Sumatra and French Indo-China?" Also the report points to the considerable areas said to produce 2,000 pounds and more per acre per annum, as well as to the wild rubber trees in the Dutch Indies which apparently do not appear in any regular statistics of planted areas.

"Only estates scientifically planned by the finest brains in the industry will survive the fight for existence that lies

ahead. In a relentless world, no industry may stand still. New uses will be found, but to deal with the potential output of rubber; they will need to be very large indeed."

Wages Should Be Higher

In his annual report for 1938, C. Wilson, Controller of Labor, discusses increased wages for labor in the tropics and suggests a scheme for attaining this. He points out that hardly had the depressed wage rates of the 1930-1934 period been raised for all races to a level approaching the pre-slump rate than a demand arose that they be reduced. This demand did not come from local firms because they know that the prosperity of Malaya depends more and more on maintaining the buying capacity of all classes. They also know that there is local capital available to finance future development and are therefore less inclined to emphasize the need of large profits to attract further capital to Malaya.

But those who desired a reduction were large companies in London controlling estates in more than one country, who, therefore, had accurate knowledge of the effect of the lower wage rates of those countries on relative costs of production. Malayan standards, however, should not be depressed by those of other countries. On the contrary, higher standards should be enforced everywhere in the tropics. There is a growing feeling in countries with decent standards of living that these standards should not be imperiled by lower standards elsewhere. This feeling, he is certain, would support a demand that those countries which have benefited by international control of production of their most important exports should try to raise the standard of living of their workers to the levels which other countries with comparable conditions have found possible.

Mr. Wilson suggests that if countries consuming rubber demanded that in return for their acceptance of restriction, the standard of living of labor in the producing countries be improved, there would be general support from Malaya. The low wages of workers in tropical countries prevents them from buying goods produced in the temperate zones. At the same time manufacturers are tempted by the low rates to establish factories in the tropics where, under inferior conditions, goods will be produced in competition with the products of laborers enjoying much higher standards in temperate countries.

NETHERLAND INDIA

Tests for Purified Rubber

The West Java Experiment Station for some time has concentrated on the production of purified rubber, a modified rubber useful where low water absorption is desirable. A series of tests was conducted to find a suitable method of determining water absorption of raw and vulcanized rubber, to be used, together with the determination of ash and nitrogen content, especially for evaluating purified rubber.

J. W. van Dalfsen[1] reports on this investigation. The influence of the conditions under which water absorption takes place is first discussed, and attention is drawn to the equation of Taylor and Kemp which, within certain limits, permits a comparison of results under different conditions. It is shown that the time of vulcanization affects water absorption, but the extent of this influence varies for different compounds. In the case of the rubber-sulphur mix used in the tests this factor was not important.

After various experiments it was decided to adopt the following method as standard, for the time being at any rate. Several layers of raw crepe rubber are submitted to a pressure of 3,000 lbs./sq. inch for 20 minutes at 90° C. in a Carver press with electrically heated plates. In this way transparent sheets, free from bubbles and about 5 mm. thick, are obtainable; but if the crude rubber is unusually hard or soft, the temperature must be raised or lowered, to get the desired result. After standing one night, three disks of 45 mm. diameter are punched from each sheet by a Schopper punching machine as is used for making rings in tensile tests with the Schopper dynamometer. The disks are weighed before and after immersion for seven hours and then 24 hours in distilled water at 80°. The water is changed after the first immersion period. The gain in weight is expressed in mg. per 100 c.m.^{2} calculated on the original surface.

It was found that with immersion for the above periods at the given temperature, water absorption is fairly well in agreement with the equation of Taylor and Kemp.

For testing vulcanized rubber a sheet 5 mm. thick is prepared from a mix of 92½ parts rubber and 7½ parts sulphur. This is vulcanized for 100 minutes at 148° C., and disks are prepared and tested in exactly the same way as for the crude rubber.

The author is anxious to have the opinions of rubber manufacturers as to the value to them of this method (in conjunction with ash and nitrogen content determination for evaluating purified rubber. If it develops that manufacturers in general prefer another method, the question of adopting a different test would be gladly considered.

[1] "Determination of Water Absorption of Rubber in Crude and Vulcanized State." *Arch. Rubbercultuur*, 3, 176-88 (1939).

Crude Rubber Exports

The Central Bureau of Statistics reports for August, 1939, exports for all Netherland India totaled 27,949 tons. Of this Java and Madoera shipped 6,367 tons, the Outer Provinces 11,103 tons, and natives in the Outer Provinces 10,479 tons.

New Planting by Natives

It is officially reported that the distribution of coupons for new planting to natives has been an unqualified success as far as East Coast Sumatra is concerned. The area allocated to natives for new planting here was 3,834 hectares, and all but 30 hectares has been taken. It is also noteworthy that 83% of those extending their plantings have applied to the Agricultural Advisors for good planting material.

PHILIPPINES

According to the Annual Report of the Insular Collector of Customs, issued by the Bureau of Customs, Commonwealth of the Philippines, Manila, the total value of imports of rubber and rubber products amounted to 5,484,330 pesos in 1938, against 4,542,174 pesos in 1937. Imports originating in the United States were valued at 4,734,940 pesos in 1938 and 3,913,230 pesos in 1937. Of the total value of imports automobile casings accounted for 3,208,049 pesos in 1938, 2,516,300 pesos in 1937. In the customs report these figures are broken down further according to type of product and include countries of origin, quantities and value, and duties. Crude rubber exports, the bulk of which was shipped to the United States, amounted to 661,931 kilos, value 352,593 pesos, in 1938, against 417,429 kilos, value 356,358 pesos in 1937.

BOOK REVIEW

"Step Out and Sell!" William E. Holler. Published by The Dartnell Corp., 4660 Ravenswood Ave., Chicago, Ill. 1939. Cloth, 6 by 9 inches, 96 pages. Price $1.50.

As the title implies, this is a book of action. Written by the head of Chevrolet's huge sales organization, it will come as a refreshing stimulant to those in the selling field. The series of short straightforward messages which make up the book contain the essence of the author's successful philosophy in promoting sales. Crammed with interesting stories and anecdotes, "Step Out and Sell!" should also prove stimulating to those outside the selling field.

Editor's Book Table

NEW PUBLICATIONS

"A Change Needed in Federal Labor Policy." No. 33 in a series of booklet-editorials by Allen W. Rucker in collaboration with N. W. Pickering, president, Farrel-Birmingham Co., Inc., Ansonia, Conn. 20 pages. Graphs. In this, their latest study of the economics of labor relations, the authors show how present federal legislation works against domestic recovery and point out some of the probable effects that may lead to a change in the government's labor policy. According to the authors, factory wages are being boosted while farm prices and income are practically stationary or declining. It is further contended that the reduction in the wage week will lead to decreased earnings with workers naturally clamoring for more pay. Several bad effects of the present labor policy are listed, as increasing unemployment, labor troubles, and price distortions. The abandonment by France of its 40-hour work week is cited as a warning to the New Deal. In conclusion the authors assert modification of present labor legislation will benefit the national economy, with the farmer especially a gainer by the reopening of the domestic market for his products and a balancing of industrial prices with his income. Contentions of the authors are supported by statistical data.

"The Vanderbilt News." November-December, 1939. R. T. Vanderbilt Co., Inc., 230 Park Ave., New York, N. Y. 28 pages. It is the intention of this issue of the *News* to show how the supplies of crude rubber in this country could be conserved, in the event of a rubber shortage or rising prices resulting from the European war, through the use of reclaim and loading materials. Formulas using the firm's loading materials and varying amounts of reclaim are given for a variety of rubber products with cost and physical test data. The types of compounds covered are: tire carcass, red and black tube, conveyer belt, cover and friction stocks, molded sole, black boot upper, pan cure and continuous vulcanization code wire insulation, black and tan matting, and three mechanical stocks.

"Bus and Diesel Batteries" and **"Truck Batteries."** The B. F. Goodrich Co., Akron, O. Two sections of 8 pages each. Illustrated. The catalog section on bus and Diesel batteries contains detailed construction features, test results, and specifications and plate dimensions; while the section devoted to truck tires covers descriptions, tests, specifications, and service cost comparisons.

"Rubber Goods — Manufacturers — United Kingdom." United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C. Price 10¢. 14 pages. This trade list, compiled from data submitted by American consular officers abroad, gives the names and addresses of rubber manufacturers in England, Scotland, and Wales. The listing is alphabetical and according to location. In some instances the relative size of the firm in its community is indicated.

"Chemical Industries Buyers' Guidebook Number, 1939-1940." *Chemical Industries,* 522 Fifth Ave., New York, N. Y. 660 pages. This guidebook for the chemical trade includes data on the following: chemical prices, 1934-1938; list of trade, technical, and scientific organizations in all branches of the chemical field; geographical directory of companies; raw materials buying guide; chemical buying guide; chemical specialties for industrial and agricultural uses with a list of their makers; index of brands and trade names; commercial and scientific synonyms; and a new section on professional services such as consultants, patent attorneys, analysts. The guidebook is distributed with subscription to *Chemical Industries.*

"Santobrite for the Preservation of Rubber Latex." Technical Bulletin No. 0-17. Monsanto Chemical Co., St. Louis, Mo. 8 pages. After pointing out the disadvantages of ammonia for the preservation of latex, i.e., volatility, odor, and reduction of latex stability in the presence of zinc oxide, this bulletin discusses the use of Santobrite,[1] sodium pentachlorphenate, as a latex preservative in the presence of only very small quantities of ammonia. The following properties of Santobrite are dealt with: effectiveness in combatting organisms which attack rubber; toxicity to human beings; water solubility; stability; physical form; and action on metals. The use of the new preservative with both normal and creamed latices is described, and the possible use of this material is suggested as a preservative against mold for smoked sheets and crepe and as a disinfectant for latex collecting cups. Physical test data demonstrate the characteristics of vulcanized films prepared from Santobrite preserved latex. The results of other tests demonstrate the compatibility of Santobrite preserved latex with compounding ingredients, particularly zinc oxide, and the added effectiveness of the new material for preserving such compounding materials as casein and gelatine.

[1] See INDIA RUBBER WORLD, Mar. 1, 1939, p. 63, for details of plantation experiments with Santobrite.

"Wage and Hour Reference Manual." Vol. 1. The Bureau of National Affairs, Washington, D. C. 228 pages. Indexed. Price, $2. This Working Manual on the Law of Wage and Hour and Child Regulation includes the text of the Fair Labor Standards Act of 1938; its legislative history and interpretation; administrative developments; regulations, rulings, orders and decisions of the Wage and Hour Division and the Children's Bureau, United States Department of Labor. This manual was designed to aid employers in conforming to the wage and hour law; thus provisions of the law and the regulations and rulings are reprinted in topical order, and chapters each cover a general subject, as administrator, wages, hours and overtime, child labor, enforcement, etc. Also included are official answers to questions that have arisen as the law has been applied in practice.

"Centrifugals—by Sharples." Sharples Corp., 2336 Westmoreland St., Philadelphia, Pa. 20 pages. This illustrated bulletin, in addition to cataloging the firm's line of centrifuging equipment, presents briefly important aspects relating to the use of centrifugals. Among the many applications pointed out is the use of Sharples centrifugals for concentrating and purifying latex.

"A. S. T. M. Standards on Textile Materials." American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. Price $2. 320 pages. This compilation includes all of the specifications, tolerances, tests, and definitions on textile materials developed by Committee D-13 of the American Society for Testing Materials. Among the specifications and tests are those which cover textile materials utilized by the rubber industry.

"What Will Social Security Mean to You?" Bion H. Francis. Published by American Institute for Economic Research, Cambridge, Mass. Price $1. 96 pages. The purpose of this booklet is to interpret and clarify the laws relating to the Social Security Act and to point out how they will affect employer, employe, and the general public. Specific examples are given to illustrate how benefits from the act may be calculated and how these benefits fit into insurance and annuity plans. Consideration is also given to those features of the act which may prove to be serious defects in the long run, and constructive criticism is offered to offset these defects.

"A Yearbook of Railroad Information." 1939 Edition. Committee on Public Relations of the Eastern Railroads, 143 Liberty St., New York, N. Y. 96 pages. A graphic and statistical picture of our railroads is presented in this booklet. The data cover salient facts regarding equipment, service, rates, earnings, purchases, employes, and operations.

"The Verigraph Recorder for the Continuous Weighing of Sheeted Materials." The Foxboro Co., Foxboro, Mass. 8 pages. The Verigraph recorder, discussed in this booklet, provides a convenient and accurate method for insuring uniformity of weight and thickness in the processing of sheet rubber or rubber-impregnated or -coated sheet materials. The Verigraph comprises a recorder and measuring head; the plates of the latter constitute an electrical condenser, the capacity of which varies according to the weight of the material passing between them. The booklet deals with the operating principles of the recorder, and stresses the refinements made in the instrument since the first unit was built in 1926. Photographs of installations in the footwear and tire fields, installation and operation data, and results of a comparative test on Verigraph and hand-control methods are also presented.

"Transport Control Abroad." United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C. For sale by the Superintendent of Documents, Washington. 40¢. 427 pages. This report reviews recent changes in transport-control methods in foreign countries directed toward the coordination or regulation of transport service. From the data presented it would appear that in no country has actual coordination of nation-wide transport service been achieved, and regulations in effect favor one form of transportation or other. Road-rail vehicles with rubber tires are discussed.

"Sixty New Synthetic Waxes." The Beacon Co., 89 Bickford St., Boston, Mass. 16 pages. The properties of sixty new synthetic waxes, divided into five groups, are briefly presented in this booklet. The properties covered include: color, melting point, hardness, acid number, and general physical characteristics such as brittleness, flexibility, and gloss. For comparative purposes a table is shown which covers the melting points and acid numbers of ten common natural waxes.

"Fine Chemicals." Carbide & Carbon Chemicals Corp., 30 E. 42nd St., New York, N. Y. 32 pages. Fine chemicals is the collective name given to those tailor-made organic chemicals which have been first synthesized in the laboratory and are now being produced by the firm in commercial quantities. This booklet describes 63 of these chemicals covering a wide range of properties. In the group are: higher alcohols, ethers and glycols, higher ketones, aldehydes, organic esters, acids and anhydrides, amines, and surface active compounds. A comprehensive summary table of the physical properties of the firm's chemical products, including fine, standard commercial, and research chemicals is included for quick reference.

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Patents and Trade Marks

MACHINERY

United States

21,230. (Reissue). **Vulcanizing Unit.** J. C. Crowley, Cleveland Heights, assignor to Dill Mfg. Co., Cleveland, both in O.
21,232. (Reissue). **Vulcanizing Unit.** H. A. Van Dyke, Philadelphia, Pa.
2,176,945. **Molding Device.** D. Roberts, assignor to Rubatex Products, Inc., both of New York, N. Y.
2,177,222. **Casing Holder.** J. A. Murphy, Des Moines, Iowa.
2,178,665. **Tread Cutter.** H. M. Janowski, South Bend, Ind., assignor to Peco Mfg. Corp., Philadelphia, Pa.
2,178,853. **Tire-Tube Testing Case.** A. D. Enriquez and P. Sussman, both of Brooklyn, N. Y.
2,178,955. **Thread Extruder.** M. Draemann, Cologne-Braunsfeld, Germany.
2,179,094. **Thread Winder and Tensioning Apparatus.** E. J. Joss, Cranston, R. I., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.
2,179,443. **Vulcanizer.** J. M. Bierer, Waban, assignor to Boston Woven Hose & Rubber Co., Cambridge, both in Mass.
2,179,819. **Vulcanizer.** A. Hoving, Calgary, Alta., Can.
2,179,842. **Apparatus for Pleated Sheet Material.** A. E. Collins, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,179,896. **Tire Collapsing Tool.** J. F. Neville, Evanston, Wyo.
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2,179,965. **Coating Apparatus.** E. C. Strube, Rome, N. Y., assignor, by mesne assignments, to American Anode Inc., Akron, O.
2,180,046. **Calender.** P. Gleissner, Dusseldorf, Germany.
2,180,304. **Molding Apparatus.** H. R. Minor, assignor to Industrial Process Corp., both of Dayton, O.

United Kingdom

505,903. **Tire Retreader.** Fit, Ltd., and J. J. Hill.
507,311. **Cable Sheath Applier.** Hartung-Jachmann A.G.
508,130. **Tire Groover.** D. Dewey.

Germany

682,164. **Tire Cutter.** Deutsche Tecalemit G.m.b.H., Windelsbleiche b.Bielefeld.
682,165. **Seamless Tube Apparatus.** Wolff & Co. K.G. Walsrode.

PROCESS

United States

21,245. (Reissue). **Expanded Rubber.** G. P. Denton, Broadhanger, Petersfield Hants, England, assignor to Rubatex Products, Inc., New York, N. Y.
2,175,399. **Friction Facing.** M. F. Judd, Stratford, Conn., assignor to Raybestos-Manhattan, Inc., Passaic, N. J.
2,175,733. **Elastic Fabric.** (Latex.) F. F. Schwartz and M. A. Chavannes, both of Paris, France, assignors, by mesne assignments, to American Ecla Corp., Dover, Del.
2,175,749. **Cable.** M. L. Eckman, assignor to American Coach & Body Co., both of Cleveland, O.
2,175,798. **Porous Rubber.** E. A. Hauser, Cambridge, assignor to Dewey & Almy Chemical Co., North Cambridge, both in Mass.
2,176,153. **Plastics.** W. L. Semon, Silver Lake Village, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,176,762. **Hose.** G. T. Forbes, assignor of one-half to R. H. Schwartz Rubber Corp., both of Cleveland, and one-half to Ohio Rubber Co., Willoughby, both in O.
2,177,062. **Battery Plate Composition.** W. A. Gibbons, Montclair, N. J., and E. Hazell, assignors, by mesne assignments, to United States Rubber Co., both of New York, N. Y.
2,177,165. **Tire Recapping.** G. O. Beckman, assignor to Super Mold Corp., both of Lodi, Calif.
2,177,377. **Attaching Rubber Parts to Metal Objects.** R. Polivka, Berwyn, Ill., assignor to Western Electric Co., Inc., New York, N. Y.
2,177,538. **Thread.** W. M. Spencer, Trenton, N. J., assignor, by mesne assignments, to Filatex Corp., New York, N. Y.
2,178,086. **Footwear.** A. Szerenyi, Cologne, Germany, assignor, by mesne assignments, to H. Rollmann, Brussels, Belgium.
2,178,498. **Rubber Process.** T. L. Shepherd, Portslade, England.
2,178,528. **Ball.** F. C. Dalmau, Barcelona, Spain.
2,178,537. **Molding Derivatives of Rubber.** H. A. Endres, Silver Lake, O., assignor to Wingfoot Corp., Wilmington, Del.
2,178,774. **Golf Ball.** B. Bogoslowsky, New York, N. Y.
2,179,444. **Belting.** J. M. Bierer, Waban, assignor to Boston Woven Hose & Rubber Co., Cambridge, both in Mass.
2,179,494. **Deodorized Gas Expanded Rubber.** L. S. Cooper, Bedford, Va., assignor to Rubatex Products, Inc., New York, N. Y.

Dominion of Canada

384,720. **Artificial Leather.** (Latex.) Paper Patents Co., Neenah, assignee of C. A. Fourness, Appleton, both in Wis., U. S. A.
384,799. **Spongy Rubber Goods.** (Latex.) International Latex Processes, Ltd., St. Peter Port, Channel Islands, assignee of E. A. Murphy, A. A. Round and T. Norcross, co-inventors, all of Birmingham, England.
384,800. **Spongy Rubber Goods.** (Latex.) International Latex Processes, Ltd., St. Peter Port, Channel Islands, assignee of E. W. Madge, A. A. Round and T. Norcross, co-inventors, all of Birmingham, England.

United Kingdom

506,077. **Gas Expanded Rubber.** Expanded Rubber Co., Ltd., and F. DeLautour.
506,151. **Cutting-Out Plastic Material.** United States Rubber Products, Inc.
506,902. **Rubber Powder.** (Latex.) Centrale Vereeniging Tot Beheer Van Proefstations Voor De Overjarige Cultures in Nederlandsch-indie.
507,801. **Wheel.** Dunlop Rubber Co., Ltd., and C. E. Goodyear.
508,700. **Treating Textiles.** H. Dreyfus.

Germany

680,902. **Varnishing Rubber.** Rohm & Haas G.m.b.H., Darmstadt.
681,220. **Electrical Hose Conductors.** Kabelwerk Vacha A.G., Vacha, Rhon.
681,595. **Reclaiming Thread from Fabric.** C. G. von Rex, Berlin-Zehlendorf.
681,815. **Uniting Footwear Parts.** Maschinenfabrik Moenus A.G., Frankfurt a.M.
681,837. **Porous Rubber-Fiber Mass.** Moulded Hair Co., Ltd., and J. A. Howard, both of London, England. Represented by G. Lotterhos and M. Eule, both of Berlin.

CHEMICAL

United States

2,175,792. **Accelerator**—N, N¹ bis (1-thio thiazyl) quinone di imine. A. M. Clifford, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.
2,175,801 and 2,175,802. **Rubber Hydrohalides.** J. B. Holden, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.
2,175,809. **Accelerator**—(D—S)$_2$—CH—COOX (D Represents an Aliphatic Thio Carbamyl Radical, and X, an Organic Amine Radical). J. G. Lichty, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.
2,175,816. **Carbon Sulphoselenides Preparation.** W. Scott, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.
2,176,860. **Antioxidant**—Aldehyde Derivative of a Ketone-Phenol Condensation Product. R. L. Sibley, Nitro, W. Va., assignor, by mesne assignments, to Monsanto Chemical Co., St. Louis, Mo.
2,176,881. **Antioxidant**—Tetramethyl Hydroxy Spiro Bis-Indane. S. G. Burroughs, Pittsburgh, Pa., assignor to Pennsylvania Coal Products Co., a corporation of Pa.
2,176,882. **Antioxidant**—Alkyl Hydroxy Spiro-Bis-Indane. C. H. Fisher, Pittsburgh, assignor to Pennsylvania Coal Products Co., Petrolia, both in Pa.
2,177,413. **Tile.** H. A. Winkelmann, assignor to Marbon Corp., both of Chicago, Ill.
2,177,547. **Diaryldithiocarbamyl Derivative Preparation.** P. C. Jones, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,177,548. **Accelerator**—(R—S—A)$_3$N Where R is an Organic Radical, and A is an Alkylene Group. P. C. Jones, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,178,536. **Antioxidant**—Reaction Product of an Aldehyde, a Diaryl Amine, and a Phenolic Compound. A. M. Clifford, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.
2,178,545. **Antioxidant**—Reaction Product of an Aromatic Hydroxy Compound, Formaldehyde, and Ammonium Hydrogen Sulphide. W. P. ter Horst, Lakewood, O., assignor to Wingfoot Corp., Wilmington, Del.
2,179,980. **Chlorinated Rubber-Cellulose Ester Compositions.** H. Michaelis, Jr., Berlin-Waidmannslust, Germany, assignor to R. M. Ritter, Frankford, Philadelphia, Pa.
2,180,082 and 2,180,083. **Polymerization Products.** (Synthetic Rubber.) M. Mueller-Cunradi and W. Daniel, both of Ludwigshafen-on-the-Rhine, assignors to I. G. Farbenindustrie A.G., Frankfurt a.M., both in Germany.
2,180,115. **Preparing Beta-Halogen-Butadienes-1, 3.** (Synthetic Rubber.) H. Lange and O. Horn, both of Frankfurt a.M.-Hochst, assignors to I. G. Farbenindustrie A.G., Frankfurt a.M., both in Germany.

Dominion of Canada

384,599. **Rubber-Metal Laminated Product.** Marbon Corp., Gary, Ind., assignee of H. A. Winkelmann, Chicago, Ill., and E. W. Moffett, Milwaukee, Wis., co-inventors, all in the U. S. A.
384,725. **Abrasive Product.** Raybestos-Manhattan, Inc., assignee of J. N. Kuzmick, both of Passaic, and L. S. Hilton, Bloomfield, co-inventors, both in N. J., U. S. A.

United Kingdom

506,863. **Latex Compositions.** Cunard White Star, Ltd., G. M. Paterson, J. Brown & Co., Ltd., and J. M. McNeill.
507,651. **Rubber-Textile Compositions for Cartridges.** A. Markey.
507,731. **Expansion Joints.** (Latex.) International Latex Processes, Ltd.
507,786. **Oiticica Oil-Chlorinated Rubber Coating Compositions.** G. W. Johnson (I. G. Farbenindustrie A.G.).
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507,996. **Rubber-Maleic Anhydride Reaction Products.** R.P.R. Association, E. H. Farmer, and J. W. Barrett.
508,036. **Cable Joints.** Standard Telephones & Cables, Ltd., T. R. Scott, R. C. Mildner, and T. E. D. Menzies.
508,057. **Insulating Compositions.** Standard Telephones & Cables, Ltd., T. R. Scott, and A. A. New.
508,129. **Antioxidants.** United States Rubber Products, Inc.
508,442. **Antioxidant.** United States Rubber Products, Inc.
508,822. **Coating Compositions.** British Cellophane, Ltd.

GENERAL

United States

2,175,245. **Socket.** J. R. Brockman, St. Louis, Mo.
2,175,389. **Whale Line.** F. Hanff, Berlin-Charlottenburg, assignor to Siemens-Schuckertwerke, A.G., Berlin-Siemensstadt, both in Germany.
2,175,418. **Friction Disk.** E. A. Wales, Cleveland, O., assignor to Raybestos-Manhattan, Inc., Bridgeport, Conn.
2,175,441 and 2,175,442. **Piston.** E. E. Miller, Fullerton, Calif.
2,175,599. **Metal Sheet Machine.** B. P. Finkbone and G. R. Hoover, both of Middletown, and H. F. Miller, Lebanon, assignors to American Rolling Mill Co., Middletown, both in O.
2,175,646. **Roller.** D. B. Replogle, Berkeley, Calif., assignor to Ohio Citizens Trust Co., Toledo, O.
2,175,648. **Blow-Out Preventer.** E. J. Roach, Beaumont, Tex.
2,175,685. **Ball.** E. O. Dieterich, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,175,713. **Inhalator Facepiece.** (Latex.) G. L. Winder, Cuyahoga Falls, assignor to American Anode Inc., Akron, both in O.
2,175,726. **Catheter.** (Latex.) P. W. Gebauer, Cleveland, assignor to American Anode Inc., Akron, both in O.
2,175,786. **Girdle.** M. R. Smarr, Harrisburg, Pa.
2,175,941. **Bath Mat and Suction Cup.** R. L. Keays, assignor of 50% to G. W. Ryder, both of Cleveland, O.
2,176,041. **Container.** P. S. Pittenger, assignor to Sharp & Dohme, Inc. (1929), both of Philadelphia, Pa.
2,176,068. **Rubber Tile.** A. C. Fischer, Chicago, Ill.

2,176,084. **Flashlight.** W. M. Lennan, Pasadena, Calif.
2,176,260. **Plug.** M. F. Johnson, Los Angeles, Calif.
2,176,309. **Gum Massager.** E. O. Love and E. J. Molitor, assignors to Lomo Gum Massager Co., all of Portland, Oreg.
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2,176,455. **Vacuum Cleaner.** D. M. Dow, assignor to Air-Way Electric Appliance Corp., both of Toledo, O.
2,176,456. **Electric Connector Equipment.** E. O. Ericson, Cleveland, O.
2,176,553. **Sewer Clean-Out.** J. F. and G. M. Walz, assignors of one-fourth to L. A. Walz, all of Hays, Kan.
2,176,565. **Valve.** S. D. Boynton, Boston, Mass.
2,176,637. **Antiskid Device.** W. H. Miller, Clairton, Pa.
2,176,734. **Belt Connector.** A. L. Freedlander, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.
2,176,735. **Belt Connector.** A. L. Freedlander and N. J. Ritzert, assignors to Dayton Rubber Mfg. Co., all of Dayton, O.
2,176,914. **Tire Wheel.** A. Massa, Jersey City, N. J.
2,176,946. **Hard Expanded Rubber.** D. Roberts, New York, N. Y., and L. S. Cooper, Bedford, Va., assignors to Rubatex Products, Inc., New York, N. Y.
2,176,968. **Knitted Fabric.** R. and E. C. Hinchliff, assignors to Burson Knitting Co., all of Rockford, Ill.
2,176,971. **Vehicle Spring.** P. Klotsch, assignor to Briggs Mfg. Co., both of Detroit, Mich.
2,177,001. **Window.** W. Owen, Pittsburgh, assignor to Pittsburgh Plate Glass Co., Allegheny County, both in Pa.
2,177,019. **Can Tester.** J. F. Egenolf, San Francisco, Calif., assignor to Continental Can Co., Inc., New York, N. Y.
2,177,042. **Tire Pressure Regulator.** P. Michael, Erfurt, Germany.
2,177,116. **Foot Supporter.** M. Persichino, Rochester, N. Y.
2,177,307 and 2,177,308. **Pants.** A. N. Spánel, Rochester, N. Y.
2,177,439. **Elastic Fabric.** J. V. Moore, assignor to Moore Fabric Co., both of Pawtucket, R. I.
2,177,442. **Life Preserver.** J. B. Reed, Sacramento, Calif.
2,177,466. **Eraser.** H. K. Stempel, assignor to W. A. Sheaffer Pen Co., Fort Madison, Iowa.
2,177,856. **Box.** (Latex.) A. Bennett, San Francisco, Calif.
2,177,893. **Vehicle.** A. S. Krotz, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,177,898. **Buffer.** C. W. Leguillon and O. F. Homeier, both of Akron, O., assignors to B. F. Goodrich Co., New York, N. Y.
2,177,940. **Abrasive Article.** S. S. Kistler, West Boylston, assignor to Norton Co., Worcester, both in Mass.
2,178,068. **De-icer.** F. Cordova, Hempstead, N. Y.
2,178,077. **Vibration Dampening Mounting.** H. J. Loftis, assignor to Henrite Products Corp., both of Ironton, O.
2,178,080. **Eraser.** J. H. Morcom, Long Beach, Calif.
2,178,188. **Container.** K. Schmidt, Brooklyn, N. Y., assignor to Marioness & Co., Inc., a corporation of N. Y.
2,178,397. **Water Heater.** R. E. Larkey, Kansas City, Mo.
2,178,421. **Roll.** A. L. Freedlander, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.
2,178,426. **Nipple.** E. I. Kilcup, Barrington, R. I., assignor to Davol Rubber Co., a corporation of R. I.
2,178,490. **Fluid-Actuated Device.** C. Nielsen, Jr., River Forest, Ill., assignor to W. L. F. Nielsen.
2,178,558. **Belt.** P. A. Cady, assignor to Raybestos-Manhattan, Inc., both of Passaic, N. J.
2,178,592. **Antiskid Device.** W. E. Lincoln, Belvidere, assignor of one-half to J. Laws, Rockford, both in Ill.
2,178,692. **Spring Shackle.** B. D. McIntyre, assignor to Monroe Auto Equipment Co., both of Monroe, Mich.
2,178,723. **Detonator.** P. M. Forsyth, Raetihi, New Zealand.
2,178,828. **Valve Cap.** L. C. Broecker, assignor to Bridgeport Brass Co., both of Bridgeport, Conn.
2,178,931. **Fluid Conduit and Conductor.** W. J. Crites and D. R. Knowlton, both of Bartlesville, Okla., assignors to Phillips Petroleum Co., a corporation of Del.
2,179,087. **Asbestos Yarn.** W. A. Gibbons, Montclair, N. J., assignor to United States Rubber Co., New York, N. Y.
2,179,125. **Fender.** I. M. Kirlin, Detroit, Mich.
2,179,168. **Printing Medium.** (Latex.) E. Alexander, London, England.
2,179,192. **Tire.** J. R. Munés and B. P. Marchant, Ilopango, San Salvador, Salvador.
2,179,223. **Squeegee Tool.** H. Siemund, assignor to Greenview Mfg. Co., both of Chicago, Ill.
2,179,255. **Pressure Indicator.** A. Edmonston, Wellston, assignor to Air Pressure Indicators, Inc., St. Louis, both in Mo.
2,179,374. **Tire and Tire Fabric.** H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.
2,179,451. **Windshield Wiper.** E. C. Horton, Hamburg, assignor to Trico Products Corp., Buffalo, both in N. Y.
2,179,454. **Windshield Wiper.** W. Paulus, assignor to Trico Products Corp., both of Buffalo, N. Y.
2,179,501. **Vaccinator.** T. K. Dorsett, Duncan Field, San Antonio, Tex.
2,179,585. **Window.** P. H. Brinkoeter, assignor to Ed. Friedrich, Inc., San Antonio, Tex.
2,179,587. **Wheel Traction Belt.** E. Deardorff, Portland, Ore.
2,179,654. **Faucet Connection.** S. L. Weiss, Brooklyn, N. Y.
2,179,691. **V-Belt.** (Synthetic Rubber.) A. L. Freedlander, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.
2,179,697. **Belt Connector.** E. H. Kremer, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.
2,179,746. **Printing Press.** G. László, New York.
2,179,812. **Well Plug.** R. M. Calkins, Fullerton, Calif.
2,179,908. **Exerciser.** Y. Uchiumi, Kanda-ku, Tokyo-shi, Japan.
2,179,964. **Nasal Pack.** R. W. Stevens, Madison, Wis.
2,180,063. **Syringe.** A. O. McKinley, Barnett, Mo.
2,180,076. **Shoe.** N. Swartz, Lynn, Mass.
2,180,086. **Clutch.** H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.
2,180,128. **Pump.** C. W. Stancliffe, London, assignor of one-half to Winget, Ltd., Rochester, both in England.
2,180,132. **Pencil.** H. Zoll, Elmhurst, assignor to Eberhard Faber Pencil Co., Brooklyn, both in N. Y.
2,180,178. **Corset.** I. R. Versoy, assignor to Berger Bros. Co., both of New Haven, Conn.
2,180,247. **Hosiery Top.** W. Larkin, Norristown, Pa., assignor to Fidelity Machine Co., Wilmington, Del.
2,180,248. **Antiseptic Dispenser.** C. Layne, Watsonville, Calif.

Dominion of Canada

384,356. **Girdle.** E. Field, London, England.
384,366. **Vibrating Body Suspension.** M. F. A. Julien, Paris, France.
384,367. **Hair Waving Apparatus.** R. M. Keele, San Francisco, Calif., U. S. A.
384,433. **Hose.** Dunlop Tire & Rubber Goods Co., Ltd., assignee of G. A. Ansell and R. C. Hughes, co-inventors, all of Toronto, Ont.
384,469. **Car Floor.** Union Asbestos & Rubber Co., assignee of J. S. Lundvall, both of Chicago, Ill., U. S. A.
384,477. **Heel Top Lift.** Wingfoot Corp., Wilmington, Del., assignee of F. H. Manchester, Akron, O., both in the U. S. A.
384,548. **Flashlight Lamp.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of H. J. Helwig, Berlin-Schoneberg, and M. Maetschke, Berlin-Charlottenburg, co-inventors, both in Germany.
384,604. **Resilient Load Bearing.** Pioneer Timber Co., Ltd., assignee of A. McKone, both of Vancouver, B. C.
384,652. **Hair Curler Pad.** R. M. McFadden, Los Angeles, Calif., U. S. A.
384,663. **Tire Inflation Control System.** C. Wiegand, Seattle, Wash., U. S. A.
384,716. **Vibrator.** C. H. Johnson & Sons, Ltd., Manchester, assignee of J. A. Hartley, Bramhall, and J. W. Philippovic, Cheadle Hulme, co-inventors, all in England.
384,758. **Tire Tool.** I. L. Hoffer, Seattle, Wash., U. S. A.
384,766. **Shoe and Sole.** P. A. Sperry, New Haven, Conn., U. S. A.
384,822. **Shorts.** C. Dreyfus, New York, assignee of R. W. Jones, New Rochelle, and W. Hollenbeck, New York, co-inventors, both in N. Y., U. S. A.
384,881 **Generator Drive.** Dayton Rubber Mfg Co., assignee of A. L. Freedlander, both of Dayton, O., and E. J. Schmidt, New York, N. Y., co-inventors, both in the U. S. A.
384,885. **Element Fastening Machine.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of United States Rubber Products, Inc., New York, N. Y., assignee of C. Anderson, now deceased, in his lifetime of Waterbury, Conn., and G. B. Baehr and G. M. Gay, both of Waterbury, and C. T. Manville, Woodbury, both in Conn., both in the U. S. A.
384,891. **Motor Support.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of E. F. Riesing, Akron, O., U. S. A.

United Kingdom

505,672. **Doors.** W. C. Atcherley.
505,837. **Cores for Molding Concrete.** C. B. Mathews and J. G. Ambrose.
505,851. **Bumper.** A. Saber.
505,925. **Lampshade Mold.** N. C. Godfrey.
506,700. **Heater.** J. R. Rideau and A. M. Ducret.
506,795. **Dog Bed.** D. Dakin.
506,801. **Resilient Mounting.** Firestone Tire & Rubber Co., Ltd.
506,917. **Tunnel Linings, Etc.** G. M. T. Rees.
506,950. **Railway-Vehicle Under-Carriage.** E. G. Budd Mfg. Co.
506,956. **Thread.** W. M. Spencer.
506,958, 506,959, and 506,975. **Vehicle Spring-Suspension.** Auto Union A.G.
506,986. **Door.** Auto Union A.G.
506,991. **Rake.** English Tools, Ltd., and E. C. Heaton.
507,010. **Aerodrome Boundary-Lights.** General Electric Co., Ltd., and G. S. Robinson.
507,023. **Pants.** A. N. Spanel.
507,024. **Diaper.** A. N. Spanel.
507,066. **Stuffing-Box Packing.** (Synthetic Rubber.) E. Bach and A. Klein.
507,068. **Sole-Molding Machine.** British United Shoe Machinery Co., Ltd. (United Shoe Machinery Corp.).
507,118. **Envelope.** A. Dobson.
507,188. **Closure.** O. Haar.
507,232. **Hair Waver.** L. Jourliac.
507,255. **Railway Vehicle Under-Carriage.** A. W. Maley and E. M. Taunton.
507,296. **Machine Support.** Naamlooze Vennootschap: Internationale Spinpot Exploitatie Maatschappij I.S.E.M.
507,301. **Apparatus for Playing Darts, Etc.** E. H. Warren.
507,310. **Ventilator.** J. D. S. Berryman.
507,325. **Boot.** G. E. Haldinstein.
507,347 **Draught-Excluder.** H. L. Sleigh, A. S. Cheston, and J. H. Booth.
507,401. **Wall-Tie.** Cordes (Dos Works), Ltd., Sharpe & Fisher (1924), Ltd., A. C. Lewis, and G. A. Fowles.
507,412. **Centrifugal.** H. Freeman.
507,427. **Molding Concrete Conduits.** C. C. Halkyard, (W. R. Hume).
507,429. **Loom.** K. T. Grondahl.
507,433. **Tire and Belting Yarn.** R. B. Newton, L. A. Grayhill, and E. C. Gwaltney.
507,466. **Screw Propeller.** K. G. Fraser.
507,483. **Flower-Exhibiting Device.** R. W. Simpson.
507,484. **Cushions and Mattresses.** P. H. W. Cloud.
507,702. **Bottle Closure.** Mallinckrodt Chemical Works.
507,709. **Vehicle Spring-Suspension.** General Motors Corp.
507,721. **Centrifugal Hydro-Extractor.** W. Pusey.
507,772. **Piston Packing.** G. J. Thomas.
507,774. **Fender.** Trinidad Leaseholds, Ltd., and A. L. L. Baker.
507,775. **Tube.** Soc. D'Etudes Chimiques pour L'Industrie.
507,973. **Book Cover.** Morland & Impey, Ltd., and A. G. Rendall.
507,794. **Radiator.** H. O. Serck.
507,844 **Valve.** Saunders Valve Co., Ltd., and A. W. Jones.
507,849. **Injection Appliance.** H. Fromm.
507,850. **Road Dressings.** A. E. H. Dussek.
507,871. **Game Apparatus.** H. Schotte.
507,906. **Discharge Lamps.** Sports Machines, Ltd., and S. H. and R. Sieff.
508,020. **Joint.** Silentbloc, Ltd., and V. A. Trier.
508,023. **Massaging and Cleansing Device.** L. Y. Booharin.
508,069. **Joint.** Silentbloc, Ltd., and V. A. Trier.
508,093. **Tire Valve.** G. Benazet.
508,108. **Device to Apply Bottle Caps.** N. W Evershed and Evershed & Co.
508,112. **Tray Rack.** G. P. Mitchell.
508,128. **Skiing truck.** M. Heller.
508,146. **Screw-Propeller Blade.** F. W. Westcott and J. A. Tait.
508,234. **Toothbrush.** A. Loeffler.
508,270. **Game.** E. P., J., and E. Magnus.
508,328. **Stencil.** W. A. Young.
508,333. **Juice Container and Duct.** F. Trzoska.
508,353. **Curtain Suspending Device.** E. V. Eyles and R. F. Findley, (trading as Eyles & Findley).
508,423. **Waterproof Garments.** A. Othmer and K. Flaig.
508,444. **Footwear.** Bata Akciova Spolecnost.
508,445. **Roller-Clearers.** J. and T. M. Greeves, Ltd., and J. V. Eves.
508,472. **Impulse Transmitter.** (Synthetic Rubber.) Automatic Telephone & Electric Co., Ltd. (Associated Electric Laboratories, Inc.).
508,478. **Sock.** F. W. S. Eyre and H. A. F. Dockrell.
508,535. **Heat-Exchange Plate.** Danske Mejeriers Maskinfabrik Andelsselskab Med Begraenset Ansvar.
508,566. **Arch Support.** J. T. J. Levi.
508,601. **Heat-Insulated Container.** Venesta, Ltd., and H. J. Barber.
508,628. **Steering Wheel.** H. P. M. Quillery.
508,720. **Truss.** F. S. S. Pearse.
508,777. **Aerial.** Daimler-Benz A.G.
508,797. **Sole-Laying Machine.** British United Shoe Machinery Co., Ltd.
508,839. **Indicating-Apparatus Supporter.** Daimler-Benz A.G.
508,886. **Hot Water Bottle.** Veedip, Ltd., and S. D. Sutton.
508,910. **Reflector.** A. Loibl.
508,949. **Cable.** A. L. Disney and Belling & Lee, Ltd.
508,964. **Fabric Drier.** W. H. Mills-Paugh.

Germany

681,627. **Buffer.** O. Foppl, Braunschweig.
681,658. **Mattress.** Wetzell Gummiwerke A.G., Hildesheim.
682,127. **Varnish Container.** Semperit Oesterreichisch-Amerikanische Gummiwerke A.G., Vienna.
682,286. **Toy.** Ungarische Gummiwaarenfabriks A.G., Budapest, Hungary. Represented by J. Reotstotter, Berlin.
682,318. **Tire.** E. Coenning, Berlin-Charlottenberg.

TRADE MARKS

United States

371,558. **Apris.** Prophylactic articles. Killian Mfg. Co., Akron, O.
371,561. Representation of three cadets containing the word: **"Cadets."** Prophylactic and membranous articles. Julius Schmid, Inc., New York, N. Y.
371,658. **Beau-Knot.** Rubber bands. W. T. Knott Co., Inc., New York, N. Y.
371,712. **Sluggers.** Footwear. **A. Werman & Sons, Inc., New York, N. Y.**
371,776. **Steccone.** Squeegees. Morse-Starrett Products Co., Oakland, Calif.
371,783. Representation of a shoe containing the word: **"shuGor."** Elastic fabrics. Thomas Taylor & Sons, Inc., Hudson, Mass.
371,804. **Airide.** Suspension and shock absorbing units. Firestone Tire & Rubber Co., Akron, O.
371,900. **Tom Sawyer.** Balloons and balls. Elder Mfg. Co., St. Louis, Mo.
371,904. Representation of a coat of arms containing the word: **"General."** Tires, inner tubes, and repair patches. General Tire & Rubber Co., Akron, O.
372,123. The word: **"Triangle"** above representation of braided wire containing the words: **"Identified Wire,"** and below the words: **"Size-Voltage-Grade."** Insulated wire. Triangle Conduit & Cable Co., Inc., Elmhurst, N. Y.
372,156. **Lassolastic.** Adhesive tape. P. Beiersdorf & Co., Inc., Long Island City, N. Y.
372,260. **Pin-It.** Dress shields. I. B. Kleinert Rubber Co., New York, N. Y.
372,367. **Playtex.** Baby pants, bathing caps, swim suits, gloves and aprons, capes, bands, and bandeaus. International Latex Corp., Dover, Del.
372,391. Representation of two silhouettes and the words: **"Sit-N-Ease by La Vivante."** Corsets, brassieres, etc. La Vivante Foundations, Inc., New York, N. Y.
372,449. **Spat-Tex.** Finish or coating material. Grand Rapids Varnish Corp., Grand Rapids, Mich.
372,451. **Hourown.** Corsets, brassieres, etc. H. W. Gossard Co., Chicago, Ill.
372,458. **Cloppers.** Rubbers or overshoes. La Crosse Rubber Mills Co., La Crosse, Wis.
372,511. **Sure-Grip.** Hospital sheeting. Stedfast Rubber Co., Inc., Boston, Mass.
372,514. **Farmway.** Inner tubes. United States Rubber Co., New York, N. Y.
372,525. Label containing representation of a coat of arms and the words: **"The General Tire."** Tires and tubes. General Tire & Rubber Co., Akron, O.
372,564. **Reliance.** Billiard table covers. Brunswick-Balke-Collender Co., Chicago, Ill.
372,575. **Handi Kurl.** Combs. Vulcanized Rubber Co., New York, N. Y.
372,611. Representation of a monogram. Printers' offset blankets, textile blankets, and coated rubber fabrics. Lloyd Mfg. Co., Inc., Apponaug, R. I.
372,624. Representation of a fish and the words: **"Fish Brand."** Rubber-coated garments. A. J. Tower Co., Boston, Mass.
372,638. **United Cross.** Gloves. United Cigar-Whelan Stores Corp., New York, N. Y.
372,644. **Brevett.** Suspenders and garters. Pioneer Suspender Co., Philadelphia, Pa.
372,683. Representation of a label containing the words: **"Air Hawk."** Tires. Mohawk Rubber Co., Akron, O.
372,687. **Shadowthin.** Elastic hosiery. Otis Clapp & Son, Inc., Boston, Mass.
372,705. **Mansfield.** Tires and tubes. Mansfield Tire & Rubber Co., Mansfield, O.
372,742 Circumferential green band over representation of a valve. Valve insides. Dill Mfg. Co., Cleveland, O.
372,801. **Monocork.** Latex compounding ingredients Armstrong Cork Co., Lancaster, Pa.
372,805. **Fera-Flex.** Flooring and bonding material. American Abrasive Metals Co., New York, N. Y.
372,868. **Manco.** Inner tubes. Manning Mfg. Co., Rutland, Vt.
372,869. **Garlock.** Brake lining. Garlock Packing Co. Palmyra, N. Y.
372,870 Representation of Calipers and rule. Brake lining. Garlock Packing Co., Palmyra, N. Y.

New Toys Made by Seiberling Latex Products Co., Including: The Donkey, Baby Panda, Jiminy Crickets, Pinocchio, Clown, and Cleo the Goldfish, All of Which, except the Panda and the Clown, Are from the Walt Disney Picture "Pinocchio"

OHIO

(*Continued from page 67*)

Disney characters, both of the new light-weight latex construction and blown rubber construction, have forced production capacity to the limit. All characters are of the stand-up type approximately six inches in height.

New Goodrich Head Arrives

John Lyon Collyer, joint managing director of the Dunlop Rubber Co., Ltd., Fort Dunlop, England, who was elected, on September 12, president of The B. F. Goodrich Co., Akron, arrived in the Rubber City on November 15 to take over his new duties.

C. B. O'Connor, general tire sales manager, has announced several changes in the Goodrich field organization. Ernest P. Weckesser, manager of the Newark district, has been appointed manager of the Detroit district, succeeding F. O. Slutz, transferred to Akron to head dealer relations. The Newark district has been merged with the New York district, of which J. E. Powers is manager. W. A. Olson, manager of the Des Moines district, has been made manager of the combined Omaha and Des Moines districts with headquarters in Omaha, whose manager, W. G. Sabine, has been assigned to other duties.

FINANCIAL

(*Continued from page 69*)

each on the combined preferred and common shares in the previous year; orders booked, $190,469,325, against $151,509,531; sales billed, $168,025,474, against $171,038,728; unfilled orders, $58,337,790, against $43,817,402.

New Incorporations

Diptex Laboratories, Inc., Sebring, O. Capital $50,000. President, W. D. Lamond, Ravenna, O. Manufacture toys, gloves, and other dipped goods from latex.

Foundry Rubber Compounds Corp., Wilmington, Del. Capital $110,000. R. Lewis, L. H. Herman, W. Lenz, all of Wilmington. Obtain and develop patents.

Green Rubber Mfg. Co., 1060 Broad St., Newark, N. J. Capital 500 shares, no par value. L. Shulman, 172 Huntingdon Terrace, and J. Fisowitz, 27 Edwards Pl., both of Newark, and F. Bowers, 229 Court Ave., Lyndhurst, both in N. J. Manufacture all kinds of rubber products.

Hy-Grade Rubber Co., 143 E. State

(*Continued on page 88*)

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Baldwin Rubber Co.	Com.	$0.12½	Jan. 20	Jan. 15
Boston Woven Hose & Rubber Co.	Com.	$0.25 irreg.	Dec. 15	Dec. 1
Boston Woven Hose & Rubber Co.	Pfd.	$3.00 s.	Dec. 15	Dec. 1
Brunswick-Balke-Collender Co.	Com.	$1.50	Dec. 15	Dec. 5
Collins & Aikman Corp.	Com.	$0.25	Dec. 1	Nov. 21
Collins & Aikman Corp.	5% Conv. Pfd.	$1.25 q.	Dec. 1	Nov. 21
Crown Cork & Seal Co., Ltd.	Com.	$0.40 q.	Nov. 15	Nov. 10
De Vilbiss Co.	Com.	$1.25 yr. end	Nov. 15	Oct. 31
Dewey & Almy Chemical Co.	Com.	$0.25	Dec. 15	Dec. 1
Dewey & Almy Chemical Co.	Class B	$0.25	Dec. 15	Dec. 1
Dewey & Almy Chemical Co.	$5 Cum. Conv. Pfd.	$1.25 q.	Dec. 15	Dec. 1
General Electric Co.	Com.	$0.65 yr. end	Dec. 20	Nov. 24
General Motors Corp.	Com.	$1.25 final	Dec. 12	Nov. 16
General Motors Corp.	$5 Pfd.	$1.25 q.	Feb. 1	Jan. 8
B. F. Goodrich Co.	Com.	$1.00 irreg.	Dec. 18	Dec. 4
Goodyear Tire & Rubber Co.	Com.	$0.25	Dec. 15	Nov. 15
Goodyear Tire & Rubber Co.	Pfd.	$1.25 q.	Dec. 15	Nov. 15
Hewitt Rubber Co.	Com.	$0.55 yr. end	Dec. 15	Dec. 1
Midwest Rubber Reclaiming Co.	Pfd.	$1.00 q.	Dec. 1	Nov. 20
Norwalk Tire & Rubber Co.	Pfd.	$0.87½ q.	Jan. 4	Dec. 20
Pharis Tire & Rubber Co.	Com.	$0.15	Dec. 20	Dec. 5
Raybestos-Manhattan, Inc.	Com.	$0.25 q.	Dec. 15	Nov. 30
Raybestos-Manhattan, Inc.	Com.	$0.50 special	Dec. 15	Nov. 30
Rex Hide, Inc.	Com.	$0.50	Nov. 20	Nov. 4
Thermoid Co.	Pfd.	$2.00 accum.	Dec. 15	Dec. 5
United Elastic Corp.	Com.	$0.10 extra	Dec. 23	Dec. 1
United Elastic Corp.	Com.	$0.10 q.	Dec. 23	Dec. 1
United States Rubber Co.	8% non-cum. 1st Pfd.	6%	Dec. 22	Dec. 8

Market Reviews

CRUDE RUBBER

Commodity Exchange

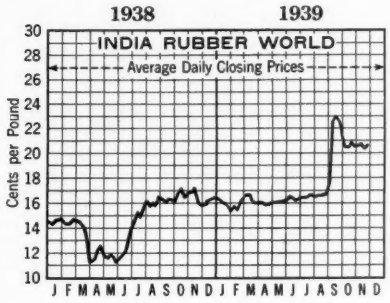
TABULATED WEEK-END CLOSING PRICES OF THE NEW YORK MARKET

Futures	Sept. 30	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25
Oct. ...	19.90	.....	.....	.....	.....	.....
Nov. ...	.....	19.65	20.20	20.45	19.95	20.35
Dec. ...	19.65	19.65	20.20	20.45	19.95	20.35
Mar. ...	18.60	18.55	18.75	18.65	18.55	19.43
July ...	18.50	18.05	18.10	17.75	17.65	18.35
Sept. ...	.....	18.05	18.10	17.60	17.45	18.05
Oct. ...	.....	.....	18.10	17.60	17.45	18.05
Volume per week (tons)...	8,270	5,350	4,460	4,500	5,840	4,980

THE rubber market, which held steady during November, featured a tight supply situation in the spot and nearby delivery months, causing a wide spread in prices between nearby and distant quotations. Leading developments during the month were record-breaking United States consumption and afloat figures for October and an increase in permissible exports for the first quarter of 1940.

March futures, which closed at 18.90¢ per pound on October 31, moved within narrow limits during November, closing at 18.88¢ per pound on November 21. Thereafter the market was stronger, and the closing price on November 28 was 19.19¢ per pound. The tightness in the December position caused a maximum spread between this month and March of 192 points on November 9. Thereafter the spread narrowed, amounting to 117 points on November 21. Trading was light; a large number of transactions consisted of switching in the December and March positions. Certified rubber stocks in licensed Commodity Exchange warehouses amounted to only 2,040 tons on November 17.

The news of an estimated all-time high in U. S. consumption of 55,764 tons during October and of a further decline



New York Outside Market—Spot Ribbed Smoked Sheets

in U. S. stocks did not materially affect the market although the consumption figure was above the estimate of the trade. Another record-breaking figure was the tonnage of rubber afloat to this country at the end of October, a factor which should aid in relieving the tight supply situation. Indications point toward high consumption for November, but somewhat under that of October.

On November 15 the International Rubber Regulation Committee fixed permissible exports of crude rubber from agreement territories for the first quarter of 1940 at 80% of basic quotas, as compared with the 75% now in effect. As basic quotas are also somewhat higher in 1940, rubber releases will be proportionately higher. The effect of the committee's decision will be to increase permissibles to a total of 107,770 tons monthly for all countries including Thailand and French Indo-China from the current 99,948 tons monthly.

According to the *Statistical Bulletin of the International Rubber Regulation Committee,* world absorption of rubber for September is estimated at 83,139 tons, against 95,039 tons in August. Consumption in this country in September was about the same as in August, and in Great Britain rubber usage increased during the first month of the war. The decline in world absorption was due entirely to those countries for which only net import figures are available instead of actual consumption statistics. Thus it is possible that the decline in world absorption in September was due to temporary dislocations in shipping schedules to those countries reporting net imports only.

The Rubber Manufacturers Association, Inc., estimates reexports of crude rubber from this country during October at 4,200 tons, which is assumed to be on the same basis as the R.M.A. estimate of 3,200 tons for September. Actual reexports reported by the Department of Commerce totaled 1,472 tons in September. Of this total, 1,382 tons were shipped to the following countries: Canada, 479 tons; Norway, 392; Mexico, 370; and Sweden, 141 tons.

New York Outside Market

The outside market continued generally quiet during November, with only routine factory business reported. A fair amount of factory interest was shown in rubber for delivery next year. Offerings from the Far East continued generally scarce and too high in price for the local market. Dealers reported a tight supply situation of all grades of spot and nearby rubber. Inquiries were reported from Spain, Portugal, and Norway in the local market. The market held steady throughout the month. The price of No. 1 ribbed smoked sheets closed at 20¾¢ per pound on October 31 and held at this level within narrow limits to close at 20⅜¢ per pound on November 21. The closing price on November 28 was 20⅝¢ per pound.

The closing prices on No. 1 ribbed smoked sheets follow: November 4, 20⅝¢; November 11, 20¾¢; November 18, 20¼¢; and November 25, 20¾¢.

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	October, 1939								November, 1939													
	23	24	25	26	27	28	30	31	1	2	3	4	6	7*	8	9	10	11*	13	14	15	16	17	18
No. 1 Ribbed Smoked Sheet.	20¾	20⅝	20⅝	20½	20½	20½	20½	20¾	20¾	20½	20⅝	20⅝	20¾	..	20¾	20¾	20¾	..	20¾	20½	20¼	20¼	20¼	20¼
No. 1 Thin Latex Crepe.....	23	22⅞	22⅞	23½	23½	23½	23½	23¾	23¾	23½	23½	23½	23¼	..	23	23	23	..	23	22½	22¾	22¾	22¾	22¾
No. 2 Thick Latex Crepe...	22¾	22⅝	22⅝	22⅝	22⅝	22⅝	22⅝	22⅞	22⅞	22¾	22⅝	22⅝	22⅞	..	22½	22½	22½	..	22½	22	21¾	21¾	21¾	21¾
No. 1 Brown Crepe.....	18¾	18⅝	18⅝	19⅛	19⅛	19⅛	19⅛	19⅜	19⅜	19⅛	19⅛	19¼	19⅜	..	19⅝	19⅝	19⅝	..	19⅝	19⅛	18⅞	18⅞	18⅞	18⅞
No. 2 Brown Crepe.....	18½	18⅜	18⅜	18⅞	18⅞	18⅞	18⅞	19¼	19⅛	18⅞	18⅞	18⅞	19¼	..	19⅜	19⅜	19⅜	..	19⅜	18⅞	18⅝	18⅝	18⅝	18⅝
No. 2 Amber.....	18¾	18⅝	18⅜	19⅛	19⅛	19⅛	19⅛	19⅜	19⅜	19⅛	19⅛	19⅛	19⅜	..	19⅝	19⅝	19⅝	..	19⅝	19⅛	18⅞	18⅞	18⅞	18⅞
No. 3 Amber.....	18½	18⅜	18⅜	18⅞	18⅞	18⅞	18⅞	19⅛	19⅛	18⅞	18⅞	18⅞	19⅛	..	19⅜	19⅜	19⅜	..	19⅜	18⅞	18⅝	18⅝	18⅝	18⅝
Rolled Brown.....	17¾	17⅝	17⅝	17¾	17¾	17¾	17¾	18	18	17¾	17¾	17¾	18¼	..	18¾	18¾	18¾	..	18¾	18½	18⅜	18⅜	18⅜	18⅜

*Holiday.

New York Outside Market (Continued)

	November, 1939					
	20	21	22	23*	24	25
No. 1 Ribbed Smoked Sheet.....	20¼	20⅜	20¾	..	20¾	20¾
No. 1 Thin Latex Crepe.....	22¾	22⅞	23	..	23	23
No. 2 Thick Latex Crepe.....	21¾	21⅞	21⅞	..	21⅞	21⅞
No. 1 Brown Crepe	18⅞	19	19⅝	..	19⅝	19⅝
No. 2 Brown Crepe	18⅝	18¾	19⅛	..	19⅛	19⅛
No. 2 Amber.....	18⅞	19	19⅝	..	19⅝	19⅝
No. 3 Amber.....	18⅝	18¾	19⅛	..	19⅛	19⅛
Rolled Brown	18⅝	18¾	18¾	..	18¾	18¾

*Holiday.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	INQUIRY
2696	Supplier of "Jarma," a latex substitute.
2697	Manufacturers of prophylactics.
2698	Supplier of Natio balata rubber and resins.
2699	Manufacturers of rubber bands.
2700	Manufacturers of sheet rubber for table tennis bats.

New York Quotations

New York outside market rubber quotations in cents per pound

	Nov. 28, 1938	Oct. 27, 1939	Nov. 27, 1939
Plantations			
Rubber latex..*gal.*	59/60	78/79	80/81
Paras			
Upriver fine	14¾	16¾	18¼
Upriver fine	*17¾	*21½	*21¼
Upriver coarse ...	10	11½	11
Upriver coarse ...	*14	*19	*19
Islands fine	14¾	17	18
Islands fine	*17	*21	*21
Acre, Bolivian fine	15	17	18
Acre, Bolivian fine	*18	*22	*21½
Beni, Bolivian fine	15¼	18	18½
Madeira fine	14¾	16¾	18¼
Caucho			
Upper ball	10	11½	11
Upper ball	*14	*19	*19
Lower ball	9½	11	10
Pontianak			
Pressed block ...	9½/17	13/18	12/18
Guayule			
Ampar	13¼	15	15
Africans			
Rio Nuñez	14	17½	17¼
Black Kassai	14	17½	17½
Prime Niger flake	25	25	25
Gutta Percha			
Gutta Siak	11¾	15	17
Gutta Soh	15	17	17
Red Macassar ...	90/1.20	1.20	1.20
Balata			
Block, Ciudad Bolivar	28	32	35
Manaos block ...	28	32	33
Surinam sheets ..	38	43	40
Amber	42	45	42

*Washed and dried crepe. Shipments from Brazil.

IMPORTS, CONSUMPTION, AND STOCKS

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks—Long Tons

Twelve Months	U. S. Imports*	U. S. Consumption¶	U. S. Stocks Mfgrs., Importers, Dealers, Etc.†	U. S. Stocks Afloat†	U. K.—Public Warehouses, London Liverpool†‡	Singapore and Penang Dealers and Port Stocks†‡	World Production (Net Exports)‡	World Consumption Estimated‡	World Stocks†‡§
1937	584,851	543,600	262,204	63,099	57,785	44,792	1,139,800	1,104,891	646,252
1938	400,178	437,031	231,500	45,105	86,853	27,084	894,940	940,939	596,498
1939									
Jan.	39,082	46,234	223,879	48,210	80,643	30,975	87,497	89,021	585,812
Feb.	36,490	42,365	217,534	55,814	75,517	28,559	77,646	83,857	569,161
Mar.	38,989	50,165	205,936	55,981	72,235	23,255	76,975	95,020	545,840
Apr.	29,601	44,166	190,896	57,918	68,931	22,434	73,820	86,639	519,032
May	47,535	44,377	193,602	54,046	66,020	20,849	70,813	89,228	512,228
June	35,947	47,259	181,794	51,274	63,878	19,563	64,419	90,845	501,218
July	36,739	43,880	174,240	52,990	57,234	27,042	84,378	87,391	.....
Aug.	38,045	50,481	161,362	66,717	44,917	20,570	92,083	95,734	.....
Sept.	41,939	50,150	150,171	68,310	.....	23,482	87,538	84,113	.....
Oct.	41,250	55,764	133,183	100,500	.....	.....	.....	.....	.....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, regulated areas, and afloat. ¶Corrected to 100% from estimate of reported coverage.

CRUDE rubber consumption by United States manufacturers during October is estimated at 55,764 long tons, the greatest monthly consumption on record, and 11.2% higher than the 50,150 long tons consumed in September and 30.1% more than the 42,850 (revised) long tons consumed in October, 1938, according to R.M.A. statistics.

Gross crude rubber imports for October are reported to be 41,250 long tons, 1.6% under the September figure of 41,939 long tons, but 19.6% over the 34,496 long tons imported in October, 1938.

Domestic stocks of crude rubber on hand October 31 totaled 133,183 long tons, against September 30 stocks of 150,171 long tons and 259,074 (revised) long tons that were on hand October 31, 1938.

Crude rubber afloat to United States ports as of October 31 is estimated to be 100,500 long tons, compared with 68,310 long tons afloat on September 30 and 51,062 long tons afloat on October 31, 1938. This amount of crude rubber afloat, the largest in years, appears to indicate an early increase is in prospect for stocks held in the United States.

Shipments of Crude Rubber from Producing Countries—Long Tons

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Thailand	French Indo-China	Total	Philippines and Oceania	Liberia†	Other Africa	South America	Mexican Guayule	Grand Total
1937.....	469,900	431,700	70,400	9,800	7,200	13,200	25,900	35,600	43,400	1,107,100	1,600*	2,300	9,100	16,300	3,400	1,139,800
1938.....	372,046	298,101	49,528	8,455	6,737	9,512	17,792	41,618	59,156	862,945	1,971*	2,929	9,000*	15,337	2,758	894,940
1939																
Jan.	24,393	38,678	7,237	764	1,115	1,604	2,342	2,918	4,739	83,790	220	528	800	1,812	347	87,497
Feb.	29,278	24,996	5,495	947	618	664	1,484	5,606	5,659	74,747	158	435	800	1,187	319	77,646
Mar.	29,298	27,934	3,718	774	619	344	1,177	5,401	4,636	73,901	230*	427	800	1,407	210	76,975
Apr.	29,779	28,341	2,225	881	379	1,687	2,446	2,660	2,581	70,979	135	533	800	1,206	167	73,820
May	29,598	24,429	2,805	1,002	668	558	1,649	2,782	4,585	68,076	129	500*	800	1,077	231	70,813
June	22,052	27,511	3,708	630	805	332	1,157	1,748	4,030	61,973	137	667	800	676	166	64,419
July	26,013	35,681	5,019	782	503	1,603	3,092	5,599	3,367	81,659	182	516	800	1,071	150†	84,378
Aug.	40,973	27,297	5,482	203	213	975	1,749	5,230	7,020	89,142	150*	500*	800	1,313	178†	92,083
Sept.	26,908	37,653	6,211	697	89	429	1,932	4,670	5,943	84,532	150*	500*	800	1,356	200*	87,538

*Estimated. †Guayule rubber imports into U.S.A. and Germany provisional until export figures from Mexico are received. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

World Net Imports of Crude Rubber—Long Tons

Year	U.S.A.	U.K.†	Argentine	Australia	Belgium	Canada	France	Greater Germany‡	Italy	Japan	Poland	Sweden	U.S.S.R.	Rest of the World	Total
1937...	592,500	135,900	9,500	19,300	15,000	36,100	60,000	115,000	24,000	62,200	6,100	6,700	30,400	52,600	1,120,400
1938...	406,330	168,172	7,653	12,309	11,310	25,696	58,148	107,917	28,170	46,307	7,849	8,304	25,676*	49,174	926,895
1939															
Jan. ..	36,614	7,121	417	954	898	2,867	4,694	9,095	2,133	2,553	665	643	4,000*	4,282	70,651
Feb. ..	30,578	8,087	1,092	1,785	1,068	1,451	5,327	8,348	2,025	3,263	709	467	1,000*	4,824	66,710
Mar. ..	45,286	12,092	440	1,324	1,242	2,458	4,503	9,028	1,525	4,019	985	581	2,000*	4,901	86,374
Apr. ..	31,590	7,129	786	1,138	855	1,559	5,650	9,316	1,926	3,579	673	994	2,000*	4,394	69,212
May ..	45,390	10,488	353	1,202	792	3,069	4,646	9,031	1,573	4,438	940	1,047	1,000*	5,783	86,795
June ..	33,950	10,287	965	1,348	621	2,465	4,649	8,677	1,992	3,067	693	2,252	500*	4,701	74,196
July ..	36,932	6,205	983	1,472	836	3,214	4,282	8,847	1,408	3,668	750*	644	1,000*	4,146	72,125
Aug. ..	38,319	9,391	600*	2,182	952	2,083	....	....	....	3,000*	....	1,057	....	4,458	75,922

*Estimated. †U. K. figures show gross imports, not net imports. ‡Including imports of Austria and Czechoslovakia. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

COMPOUNDING INGREDIENTS

THE volume of compounding materials moving into consumption during November continued heavy, although a slight slackening in demand for some ingredients was noted toward the end of the month. With current rubber manufacturing schedules being well maintained, business should continue brisk at least for the remainder of the year. Prices in general are firm.

CARBON BLACK. Activity tapered off slightly during November, with consumption demands satisfactory and shipments still exceeding production. One supplier has announced, effective January 1, prices of 2.3¢ in bulk and 2.5¢ in bags f.o.b. plant in the Panhandle, against the present 2.25¢ for both. Other suppliers have not announced any changes.

Since January 1, 1939, when black stocks were at the high level of 157,000,000 pounds, the sales-over-production excess, pronounced during September and October, has resulted in the lowering of stocks to approximately 137,000,000 pounds at the end of October. With reserve production capacity available this stock is held by producers to be ample.

FACTICE OR RUBBER SUBSTITUTE. The demand continues good, with prices advancing for some grades of substitute.

LITHARGE. Buying during the month was moderate, with prices unchanged.

LITHOPONE. Demand was fair, and the price continues firm. Contracts for delivery in the first quarter of 1940 will be offered at present prices.

RUBBER CHEMICALS. The demand for accelerators and antioxidants continued excellent. There has been a noticeable activity in export inquiry, although little increase in actual business has been noted as yet. Prices in general are firm and unchanged.

RUBBER SOLVENTS. Tire makers continued buying these solvents in good volume during November. The price is steady at 9½¢ per gallon.

TITANIUM PIGMENTS. Rubber continued to purchase these pigments, particularly the pure titanium dioxide type, in good volume. A well-sustained demand for white and light colored goods has contributed to market activity. Demand from the paint trade has shown the usual seasonal decline. Prices continue at last month's levels, and orders on contract for the first quarter of 1940 are now being accepted on the present price basis.

ZINC OXIDE. Continued heavy buying by both the rubber and paint trade has resulted in increased domestic production of zinc oxide. While export inquiry has been active since the outbreak of the war, American producers are giving first attention to domestic consumers. The price is firm. Contracts for delivery in the first quarter of 1940 will be offered at present prices.

New York Quotations*

November 24, 1939

Abrasives			
Pumicestone, powdered	lb.	$0.03	/$0.035
Rottenstone, domestic	lb.	.03	/ .035
Silica, 15	ton		
Accelerators, Inorganic			
Lime, hydrated, l.c.l., New York	ton	20.00	
Litharge (commercial)	lb.	.0675/	.0725
Accelerators, Organic			
A-1	lb.	.24	/ .30
A-10	lb.	.31	/ .35
A-11	lb.	.52	/ .65
A-19	lb.	.55	/ .65
A-32	lb.	.70	/ .80
A-77	lb.	.42	/ .55
A-100	lb.	.42	/ .55
Accelerator 49	lb.	.40	/ .42
737	lb.	.42	/ .43
737-50	lb.	.25	/ .26
808	lb.	.70	/ .72
833	lb.	1.15	
Acrin	lb.	.60	
Aldehyde ammonia	lb.	.70	
Altax	lb.	.55	/ .70
B-J-F	lb.	.50	/ .55
Beutene	lb.	.70	/ .75
Butyl Eight	lb.		
Zimate	lb.	2.50	
C-P-B	lb.	2.00	
Captax	lb.	.50	/ .60
Crylene	lb.	.40	/ .47
Paste	lb.	.30	/ .36
D-B-A	lb.	2.00	
Delac A	lb.	.40	/ .50
O	lb.	.40	/ .50
P	lb.	.40	/ .50
Di-Esterex	lb.	.60	/ .70
N	lb.	.60	/ .70
DOTG (Di-ortho-tolylguanidine)	lb.	.44	/ .46
DPG (Diphenylguanidine)	lb.	.35	/ .36
El-Sixty	lb.	.50	/ .65
Ethylideneaniline	lb.	.42	/ .43
Ethyl Zimate	lb.	2.50	
Formaldehyde P.A.C.	lb.	.0625	
Formaldehydeaniline	lb.	.31	
Formaldehyde-para-toluidine	lb.	.52	/ .54
Guantal	lb.	.40	/ .50
Hepteen	lb.	$0.35	/$0.40
Base	lb.	1.35	/ 1.50
Hexamethylenetetramine U.S.P.	lb.	.39	
Technical	lb.	.33	
Lead oleate, No. 999	lb.	.14	
Witco	lb.	.15	
Monex	lb.	2.35	
Novex	lb.		
O. N. V.	lb.	1.00	/ 1.10
O-X-A-F	lb.	.50	/ .55
Ovac	lb.	.50	/ .55
Para-nitroso-dimethylaniline	lb.	.85	
Pentex	lb.	1.00	/ 1.10
Flour	lb.	.15	/ .16
Pip-Pip	lb.	2.50	
Pipsolene	lb.	1.55	/ 1.85
R-2	lb.	1.40	/ 1.80
R-23	lb.	.40	
R & H 50-D	lb.	.42	/ .43
Rotax	lb.	.60	/ .65
Safex	lb.	1.20	/ 1.30
Santocure	lb.	.80	/ 1.00
Super-sulphur No. 1	lb.	.50	
2	lb.	.18	/ .25
Tetrone A	lb.	2.70	
Thiocarbanilide	lb.	.24	
Thionex	lb.	2.35	
Trimene	lb.	.55	/ .65
Base	lb.	1.05	/ 1.20
Triphenylguanidine (TPG)	lb.	.45	
Tuads	lb.	2.35	
Ureka	lb.	.60	/ .75
Blend B	lb.	.60	/ .75
C	lb.	.56	/ .65
Vulcanex	lb.	.42	/ .43
Vulcanol	lb.	.85	
Z-B-X	lb.	2.50	
Zenite	lb.	.46	/ .48
A	lb.	.53	/ .55
B	lb.	.46	/ .48
Zimate	lb.	2.35	
Activator			
Aero Ac 50	lb.	.46	/ .52
Barak	lb.	.50	
Age Resisters			
AgeRite Alba	lb.	1.50	/ 2.00
Exel	lb.	1.00	/ 1.40
Gel	lb.	.57	/ .75
Hipar	lb.	.65	/ .92
Powder	lb.	.52	/ .65
Resin	lb.	.52	/ .65
D	lb.	.52	/ .65
White	lb.	1.25	/ 1.65
Akroflex C	lb.	$0.56	/$0.58
Albasan	lb.	.70	/ .75
Aminox	lb.	.52	/ .61
Antox	lb.	.56	
B-L-E	lb.	.52	/ .61
Powder	lb.	.65	/ .74
B-X-A	lb.	.52	/ .61
Copper Inhibitor X-872-A	lb.	1.15	
Flectol B	lb.	.52	/ .65
H	lb.	.52	/ .65
White	lb.	.90	/ 1.15
M-U-F	lb.	1.50	
Neozone (standard)	lb.	.63	
A	lb.	.52	/ .54
B	lb.	.63	
C	lb.	.52	/ .54
D	lb.	.52	/ .54
E	lb.	.63	
Oxynone	lb.	.64	/ .80
Parazone	lb.	.68	
Permalux	lb.	1.20	
Santoflex B	lb.	.52	/ .65
Solux	lb.	1.30	
Thermoflex A	lb.	.65	/ .67
V-G-B	lb.	.52	/ .61
Alkalies			
Caustic soda, flake, Columbia (400 lb. drums)	100 lbs.	2.70	/ 3.55
liquid, 50%	100 lbs.	1.95	
solid (700 lb. drums)	100 lbs.	2.30	/ 3.15
Antiscorch Materials			
A-F-B	lb.	.35	/ .40
Antiscorch T	lb.	.90	
E-S-E-N	lb.	.35	/ .40
R-17 Resin (drums)	lb.	.10	
RM	lb.	1.25	
Retarder W	lb.	.36	
U.T.B.	lb.	.35	/ .40
Antisun Materials			
Heliozone	lb.	.21	
Sunproof	lb.	.20	/ .25
Colors			
Black			
Du Pont powder	lb.	.42	/ .44
Lampblack (commercial)	lb.	.15	
Blue			
Brilliant	lb.		
Du Pont dispersed	lb.	.83	/ 3.60
Powders	lb.	2.25	/ 3.75
Prussian	lb.		
Toners	lb.	.08	/ 3.85
Brown			
Mapico	lb.	.11	
Green			
Brilliant	lb.		
Chrome, light	lb.		
medium	lb.	.22	
oxide (freight allowed)	lb.		
Dark	lb.		
Du Pont dispersed	lb.	.98	/ 1.75
Powders	lb.	1.00	/ 2.00
Guignet's, Easton, Pa., bbls.	lb.	.70	
Light	lb.		
Toners	lb.	.85	/ 3.75
Orange			
Du Pont dispersed	lb.	.88	/ .90
Powders	lb.	.80	/ 2.50
Lake	lb.		
Toners	lb.	.40	/ 1.60
Orchid			
Toners	lb.	1.50	/ 2.00
Pink			
Toners	lb.	1.50	/ 2.00
Purple			
Permanent	lb.		
Toners	lb.	.60	/ 2.10
Red			
Antimony Crimson, 15/17%	lb.		
R. M. P. No. 3	lb.	48	
Sulphur free	lb.		
R.M.P.	lb.	.52	
Golden 15/17%	lb.		
7-A	lb.	.37	
Z-2	lb.	.23	
Aristi	lb.		
Cadmium, light (400 lb. bbls.)	lb.	.75	/ .80
Chinese	lb.		
Crimson	lb.		
Du Pont dispersed	lb.	.93	/ 2.05
Powders	lb.	.52	/ 1.85
Mapico	lb.	.0925	
Medium	lb.		
Rub-Er-Red, Easton, Pa., bbls.	lb.	.0925	
Scarlet	lb.		
Toners	lb.	.08	/ 2.00
White			
Lithopone (bags)	lb.	.0375/	.04
Albalith Black Label-11	lb.	.0375/	.04
Astrolith	lb.	.0375/	.04
Azolith	lb.	.0375/	.04

*Prices not recorded will be supplied on application.

White (Cont'd)

Lithopone (*Cont'd*)		
Cryptone-BA-19	*lb.*	$0.0525/$0.055
BT	*lb.*	.0525/ .055
CB	*lb.*	.0525/ .055
ZS No. 20	*lb.*	.075 / .0775
86	*lb.*	.075 / .0775
230	*lb.*	.075 / .0775
Sunolith	*lb.*	.0375/ .04
Ray-Bar	*lb.*	.0525/ .0625
Ray-Cal	*lb.*	.0525/ .0625
Rayox	*lb.*	.13 / .16
Titanolith (5-ton lots)	*lb.*	.0525/ .055
Titanox-A (50-lb. bags)	*lb.*	.13 / .1375
B (50-lb. bags)	*lb.*	.0525/ .055
30 (50-lb. bags)	*lb.*	.0525/ .055
C (50-lb. bags)	*lb.*	.0525/ .055
M (50-lb. bags)	*lb.*	.0525/ .055
Ti-Tone	*lb.*	
Zinc Oxide		
Azo ZZZ-11	*lb.*	.0625/ .065
44	*lb.*	.0625/ .065
55	*lb.*	.0625/ .065
66	*lb.*	.0625/ .065
French Process, Florence		
White Seal-7 (bbls.)	*lb.*	.085 / .0875
Gren Seal-8	*lb.*	.08 / .0825
Red Seal-9	*lb.*	.075 / .0775
Kadox, Black Label-15	*lb.*	.065 / .0675
No. 25	*lb.*	.075 / .0775
Red Label-17	*lb.*	.065 / .0675
Horse Head Special 3	*lb.*	.0625/ .065
XX Red-4	*lb.*	.0625/ .065
23	*lb.*	.0625/ .065
72	*lb.*	.0625/ .065
78	*lb.*	.0625/ .065
80	*lb.*	.0625/ .065
103	*lb.*	.0625/ .065
110	*lb.*	.0625/ .065
St. Joe (lead free)		
Black Label	*lb.*	.0625/ .065
Green Label	*lb.*	.0625/ .065
Red Label	*lb.*	.0625/ .065
U.S.P.	*lb.*	.095 / .0975
White Jack	*lb.*	.075 / .0775
Zopaque	*lb.*	.13 / .1375

Yellow

Cadmolith (cadmium yellow), 400 lb. bbls.	*lb.*	.50 / .55
Du Pont dispersed	*lb.*	1.25 / 1.75
Powders	*lb.*	1.55 / 1.37
Lemon	*lb.*	
Mapico	*lb.*	.0675
Toners	*lb.*	2.50

Dispersing Agents

Darvan	*lb.*	.30 / .47
Nevoll (drums)	*lb.*	.0215
Santomerse S	*lb.*	.11 / .25

Fillers, Inert

Asbestine, c.l., f.o.b., mills	*ton*	15.00
Barytes	*ton*	30.00 /36.00
f.o.b., St. Louis (50 lb. paper bags)	*ton*	22.85
off color, domestic	*ton*	20.00 /25.00
white, imported	*ton*	29.00 /32.00
Blanc fixe, dry, precip.	*lb.*	.03 / .035
Calcene	*ton*	37.50 /43.00
Infusorial earth	*lb.*	.02 / .03
Kalite No. 1	*ton*	24.00 /50.00
3	*ton*	34.00 /60.00
Magnesia, calcined, heavy	*lb.*	.04
Carbonate, l.c.l.	*lb.*	.07 / .095
Pyrax A	*ton*	6.50 /20.00
Whiting		
Columbia Filler	*ton*	9.00 /14.00
Guilders	100 *lbs.*	
Paris white, English cliff-stone	100 *lbs.*	
Southwark Brand, Commercial	100 *lbs.*	
All other grades	100 *lbs.*	
Suprex, white extra light	*ton*	45.00 /60.00
heavy	*ton*	45.00 / 60.00
Witco, c.l.	*ton*	6.00

Finishes

Rubber lacquer, clear	*gal.*	
colored	*gal.*	
Starch, corn, pwd.	100 *lbs.*	
potato	*lb.*	
Talc	*ton*	25.00 /45.00

Flock

Cotton flock, dark	*lb.*	.10 / .12
dyed	*lb.*	.40 / .80
white	*lb.*	.12 / .20
Rayon flock, colored	*lb.*	1.00 / 2.00
white	*lb.*	.75 / 1.00

Latex Compounding Ingredients

Accelerator 85	*lb.*	.35
89	*lb.*	1.40
122	*lb.*	1.55
552	*lb.*	2.50
Aerosol OT Aqueous 10%	*lb.*	.15 / .25
Antox, dispersed	*lb.*	.42
Aquarex A	*lb.*	.35
D	*lb.*	.75
F	*lb.*	.85
WA Paste	*lb.*	.25
Areskap No. 50	*lb.*	.18 / .24
100, dry	*lb.*	.39 / .51
Aresket No. 240	*lb.*	.16 / .22
300, dry	*lb.*	.42 / .50
Aresklene No. 375	*lb.*	$0.35 /$0.50
400, dry	*lb.*	.51 / .65
Black No. 25, dispersed	*lb.*	.22 / .40
Catalpo	*ton*	
Collocarb	*lb.*	.055 / .07
Color Pastes, dispersed	*lb.*	.35 / 1.90
Dispersex No. 15	*lb.*	.11 / .12
No. 20	*lb.*	.08 / .10
Emo, brown	*lb.*	.15
white	*lb.*	.15
Factice Compound, dispersed	*lb.*	.36
Heliozone, dispersed	*lb.*	.25
Igepon A	*lb.*	
MICRONEX, Colloidal	*lb.*	.055 / .07
Nekal BX (dry)	*lb.*	
Palmol	*lb.*	.13
Pipsol X	*lb.*	3.05 / 3.55
R-2 Crystals	*lb.*	2.50 / 2.75
R-23	*lb.*	.40
R-N-2	*lb.*	1.40 / 1.80
Crystals	*lb.*	2.00 / 2.25
S.1 (400 lb. drums)	*lb.*	.65
Santobrite	*lb.*	
Santomerse D	*lb.*	.41 / .65
S	*lb.*	.11 / .25
No. 1	*lb.*	.18 / .35
No. 2	*lb.*	.18 / .35
No. 3	*lb.*	.40 / .65
No. 3P	*lb.*	.29 / .45
Santovar A	*lb.*	1.15 / 1.40
Stablex A	*lb.*	.90 / 1.10
B	*lb.*	.65 / .90
C	*lb.*	.40 / .50
Sulphur, dispersed	*lb.*	.10 / .15
No. 2	*lb.*	.075 / .15
T.1. (400 lb. drums)	*lb.*	.40
Tepidone	*lb.*	1.45
Vulcan Colors	*lb.*	
Zinc oxide, dispersed	*lb.*	.12 / .15

Mineral Rubber

Black Diamond	*ton*	25.00
Hydrocarbon, hard	*ton*	21.00 /42.00
Parmr	ton	21.00 /25.00
Pioneer	*ton*	
285°-300°	*ton*	21.00 /42.00

Mold Lubricants

Mold Paste	*lb.*	.12 / .18
Sericite	*ton*	65.00 /75.00
Soapbark	*lb.*	
Soapstone	*ton*	25.00 /35.00

Oil Resistant

AXF	*lb.*	.40 / .50

Reenforcers

Carbon Black		
Aerfloted Arrow Specification Black	*lb.*	.0275/ .0625
Arrow Compact Granulized Carbon Black	*lb.*	.0275/ .0625
"Certified" Heavy Compressed, Cabot	*lb.*	
Spheron	*lb.*	
Continental Dustless, c.l.	*lb.*	.0275
Compressed, c.l.	*lb.*	.0275
Uncompressed, c.l.	*lb.*	.0275
Disperso, c.l.	*lb.*	.0275/ .0375
Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	*lb.*	.0275
c.l., delivered New York	*lb.*	.0351/ .0375
local stock, bags, delivered	*lb.*	.0625
Dixiedensed, c.l., f.o.b., New Orleans, La., Galveston or Houston, Tex.	*lb.*	.0275
c.l., delivered New York	*lb.*	.0351/ .0375
local stock, bags, delivered	*lb.*	.0625
Dixiedensed, 66, c.l., f.o.b., New Orleans, La., Galveston or Houston, Tex.	*lb.*	.0275
c.l., delivered New York	*lb.*	.0351/ .0375
local stock, bags, delivered	*lb.*	.0625
Excello, c.l., f.o.b., Gulf ports	100 *lbs.*	2.75 / 4.75
delivered New York	100 *lbs.*	3.75 / 5.75
l.c.l., delivered New York	100 *lbs.*	5.75 / 7.00
Fumonex, c.l., f.o.b. works	*lb.*	.03
ex-warehouse	*lb.*	.05
Gastex	*lb.*	.03 / .07
Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	*lb.*	.0275
c.l., delivered New York	*lb.*	.0351/ .0375
local stock, bags, delivered	*lb.*	.0625
Kosmobile 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	*lb.*	.0275
c.l., delivered New York	*lb.*	.0351/ .0375
local stock, bags, delivered	*lb.*	.0625
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	*lb.*	.0275
c.l., delivered New York	*lb.*	.0351/ .0375
local stock, bags, delivered	*lb.*	.0625
MICRONEX Beads, c.l., f.o.b., Gulf ports	lb.	$0.0275
c.l., delivered, New York	*lb.*	.0375
local stock, bags, delivered	*lb.*	.0625
Mark II, c.l., f.o.b. Gulf ports	*lb.*	.0275
c.l., delivered, New York	*lb.*	.0375
local stock, bags, delivered	*lb.*	.0625
Standard, c.l., f.o.b. Gulf ports	*lb.*	.0275
c.l., delivered, New York	*lb.*	.0375
local stock, bags, delivered	*lb.*	.0625
W-5, c.l., f.o.b., Gulf ports	*lb.*	.0275
c.l., delivered, New York	*lb.*	.0375
local stock, bags, delivered	*lb.*	.0625
W-6, c.l., f.o.b., Gulf ports	*lb.*	.0275
c.l., delivered, New York	*lb.*	.0375
local stock, bags, delivered	*lb.*	.0625
Paradene No. 2 (drums)	*lb.*	.04
Pelletex	*lb.*	.03 /$0.07
Supreme, c.l., f.o.b. Gulf ports	100 *lbs.*	2.75 / 4.75
delivered New York	100 *lbs.*	3.75 / 5.75
l.c.l., delivered New York	100 *lbs.*	5.75 / 7.00
"WYEX BLACK"	*lb.*	.0275/ .0625

Clays

Aerfloted Paragon (50 lb. bags)	*ton*	9.50 /22.00
Suprex (50 lb. bags)	*ton*	9.50 /22.00
Barden	*lb.*	
Chicora	*lb.*	
China	*ton*	17.50 /20.00
Crown, f.o.b. (plant)	*ton*	9.50
Dixie	*ton*	9.50 /24.00
Hi-White, f.o.b. Huber Ga.	*ton*	9.50
McNamee	*ton*	9.50 /22.00
Par	*ton*	9.50 /22.00
Witco, f.o.b. works	*ton*	9.50
P-33	*lb.*	.0475/ .0775
Thermax	*lb.*	.0175/ .05
Velvetex	*lb.*	.022 / .035

Reodorants

Amora A	*lb.*	
B	*lb.*	
C	*lb.*	
D	*lb.*	
Curodex 19	*lb.*	2.75
188	*lb.*	3.50
198	*lb.*	4.50
Rodo No. 0	*lb.*	3.50 / 4.00
10	*lb.*	4.50 / 5.00

Rubber Substitutes

Black	*lb.*	.08 / .12
Brown	*lb.*	.08 / .11
White	*lb.*	.085 / .125
Factice		
Amberex	*lb.*	.30
Brown	*lb.*	.08 / .11
Fac-Cel B	*lb.*	.13
C	*lb.*	.13
Neophax A	*lb.*	.0975
B	*lb.*	.0975
White	*lb.*	.09 / .12

Softeners

Bondogen	*lb.*	.98 / 1.50
Burgundy pitch	*lb.*	.06
Cycline oil	*gal.*	.14 / .20
Nuba resinous pitch (drums) Grades No. 1 and No. 2	*lb.*	.0265
Nubalene Resin	*lb.*	.025
Palm oil (Witco), cl.	*lb.*	
Pine tar	*gal.*	
Plastogen	*lb.*	.0775/ .12
R-19 Resin (drums)	*lb.*	.10
R-21 Resin (drums)	*lb.*	.10
Reogen	*lb.*	.115 / .26
Rosin oil, compounded	*gal.*	.40
RPA No. 1	*lb.*	.65
2	*lb.*	.65
3	*lb.*	.46
Rubtack	*lb.*	.10
Tackol	*lb.*	.085 / .18
Tonox	*lb.*	.52 / .61
Tonox D	*lb.*	.75 / .85
Witco No. 20	*gal.*	.20
X-1 Resinous oil (tank car)	*lb.*	.019

Solvents

Beta-Trichlorethane	*gal.*	
Carbon bisulphide	*lb.*	
tetrachloride	*lb.*	
Industrial 90% benzol (tank car)	*gal.*	.16
Skellysolve	*gal.*	

(*Continued on page* 88)

Adamson mixing and moulding equipment for the Rubber, Bakelite, Plastic, and allied industries, is built to meet modern production demands for greater accuracy, and lower cost. Every unit represents a background of investigation and factory experience that guarantees efficient operation and mechanical perfection.

RUBBER EQUIPMENT

AMCO ESTABLISHED 1892

The ADAMSON MACHINE Co.
AKRON » » » OHIO

An International Standard of Measurement for
Hardness ● Elasticity
Plasticity of Rubber, etc.
Is the DUROMETER and ELASTOMETER (23rd year)

These are all factors vital in the selection of raw material and the control of your processes to attain the required modern Standards of Quality in the Finished Product. Universally adopted.

It is economic extravagance to be without these instruments. Used free handed in any position or on Bench Stands, convenient, instant registrations, fool proof.

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THE SHORE INSTRUMENT & MFG. CO.
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Crude Rubber
Liquid Latex
Carbon Black
Crown Rubber Clay

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Regular and Special Constructions
of
COTTON FABRICS

Single Filling Double Filling
and
ARMY
Ducks

HOSE and BELTING
Ducks

Drills

Selected
Osnaburgs

Curran & Barry
320 BROADWAY
NEW YORK

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Sept. 30	Oct. 28	Nov. 4	Nov. 11	Nov. 18	Nov. 25
Oct. ...	9.42	....	...	....	....	....
Nov. ...	....	9.19	9.25	9.57	....	....
Dec. ...	9.14	9.29	9.35	9.67	9.87	9.78
Mar. ...	8.88	9.12	9.21	9.48	9.68	9.61
July ...	8.48	8.90	8.90	9.07	9.15	9.11
Sept. ...	....	8.67	8.76	8.79	8.82	8.81
Oct. ...	....	8.45	8.55	8.51	8.50	8.52

THE cotton market strengthened in November under the impetus of active foreign buying and domestic mill demand. The New York 1 1/16-inch spot middling price, after closing at 9.41¢ per pound on November 1, rose steadily throughout the month to close at 10.16¢ per pound on November 22. Thereafter the market was steady, and the closing price on November 28 was 10.20¢.

The Census Bureau reported consumption of all cotton in domestic mills for October totaled 686,936 bales, against 624,902 bales in September and 543,857 in October, 1938. The October consumption figure was the largest for any month since April, 1937. Cotton exports in October were 886,332 bales, against 649,057 in September and 464,439 in October, 1938. Cotton imports were 13,678 bales, against 9,746 in September and 10,933 in October, 1938.

On November 8 the Crop Reporting Board, Department of Agriculture, estimated cotton production from this year's crop as of November 1 at 11,845,000 bales, 83,000 bales below the 11,928,000 predicted the previous month. Ginnings up to November 1 were reported at 10,085,260 running bales.

The government on November 8 announced a loan on cotton of the 1939-40 production to which farmers still hold title. The loan was placed at 8.30¢ a pound gross weight basis for 7/8-inch middling cotton, the same price loaned last year. The new program will differ from the previous loan policy in that allowances for distances and "tares" will be made which will actually make the loans range from 8.7 to 9.2¢ per pound.

Fabrics

During the past month the fabrics markets featured an active demand for sheetings and osnaburgs, chiefly from bag manufacturers. The heavy business in bag goods was reported to be a result of the European war and an exhaustion of burlap supplies. Production of fabrics in general has been sold well into the first quarter of next year, and buyers are finding it difficult to place orders for spot or nearby delivery. A resumption of large-scale buying is not expected until early this month when buying for spring requirements will begin. Currently the raincoat business is quiet owing to the lack of rain throughout the country.

The market is steady; tire fabrics and Hollands are unchanged in price; while only relatively few types of constructions in the other fabric divisions show small changes in price.

New York Quotations

November 24, 1939

Drills		
38-inch 2.00-yard	yd.	$0.13
40-inch 3.47-yard		.08
50-inch 1.52-yard		.18¼
52-inch 1.85-yard		.15¾
52-inch 1.90-yard		.14½
52-inch 2.20-yard		13¾
52-inch 2.50-yard		.12
59-inch 1.85-yard		.15
Ducks		
38-inch 2.00-yard D.F.	yd.	.13
40-inch 1.45-yard S. F.		.18¾
51½-inch 1.35-yard D. F.		.19¼
72-inch 1.05-yard D. F.		.26¼/.29
72-inch 17.21-ounce		.32¼
Mechanicals		
Hose and belting	lb.	.29½
Tennis		
52-inch 1.35-yard	yd.	.21½
Hollands		
Gold Seal and Eagle		
20-inch No. 72	yd.	.10
30-inch No. 72		.18
40-inch No. 72		.20
Red Seal and Cardinal		
20-inch	yd.	.08½
30-inch		.15¾
40-inch		.17
50-inch		.26
Osnaburgs		
40-inch 2.34-yard	yd.	.11½
40-inch 2.48-yard		.10½
40-inch 2.56-yard		.09¼
40-inch 3.00-yard		.08⅞
40-inch 7-ounce part waste		.08⅞
40-inch 10-ounce part waste		.12¾
37-inch 2.42-yard		.10¾
Raincoat Fabrics		
Cotton		
Bombazine 60 x 64	yd.	.08
Plaids 60 x 48		.10¾
Surface prints 60 x 64		.11¾
Print cloth, 38½-inch, 60 x 64		.05¼
Sheetings, 40-inch		
48 x 48, 2.50-yard	yd.	.09¼
64 x 68, 3.15-yard		.08¾
56 x 60, 3.60-yard		.07½
44 x 40, 4.25-yard		.06½
Sheetings, 36-inch		
48 x 48, 5.00-yard	yd.	.05¼
44 x 40, 6.15-yard		.04⅜
Tire Fabrics		
Builder		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.29
Chafer		
14 ounce 60" 20/8 ply Karded peeler	lb.	.29
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.28
Cord Fabrics		
23/5/3 Karded peeler, 1 1/16" cotton	lb.	.29½
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.27½
12/4/2 Karded peeler, 1 1/16" cotton	lb.	.26½
23/5/3 Karded peeler, 1¼" cotton	lb.	.35
23/5/3 Combed Egyptian	lb.	.48½
Leno Breaker		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.31

RECLAIMED RUBBER

ACCORDING to R. M. A. figures, October reclaimed consumption is estimated at 18,955 long tons, 11.2% over that of September; production 20,896 long tons; and stocks on hand October 31, 21,829 long tons. The high level of activity reported for October continued through November, with a slight general easing off in demand noted toward the latter part of the month. It is expected that November reclaim consumption will be about the same as that of October.

The market is firm, with all grades of reclaim continuing unchanged.

New York Quotations

November 24, 1939

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6 / 6¼
Acid	1.18-1.22	7 / 7¼
Shoe		
Standard	1.56-1.60	6½/ 6¾
Tubes		
Red Tube	1.15-1.30	9 / 9¼
Compound	1.10-1.20	9 /10
Miscellaneous		
Mechanical Blends	1.25-1.50	4½/ 5
White	1.35-1.50	12½/14

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

Rubber and Canvas Footwear Statistics

Thousands of Pairs

	Inventory	Production	Shipments
1937	20,430	74,102	67,191
1938	16,183	50,812	54,942
1939			
Jan.	16,157	4,807	4,778
Feb.	16,582	4,953	4,629
Mar.	17,281	5,897	5,214
Apr.	18,083	5,216	4,414
May	19,055	5,033	4,017
June	19,729	4,866	4,192
July	18,115	3,280	4,894
Aug.	16,956	5,090	6,213
Sept.	15,218	4,713	6,452

The above figures have been adjusted to represent 100% of the industry based on reports received which represented 81% for 1936-37.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington.

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption†	Consumption % to Crude	U. S. Stocks*	Exports
1937	185,033	162,000	29.8	28,800	13,233
1938	122,403	120,800	27.6	23,000	7,405
1939					
Jan.	14,826	13,743	29.7	23,334	748
Feb.	14,102	13,347	31.5	23,461	630
Mar.	15,647	16,197	32.3	22,155	756
Apr.	14,527	13,391	30.3	22,628	748
May	14,769	13,517	30.5	22,771	1,008
June	15,871	14,870	31.5	23,058	759
July	12,588	13,542	30.9	21,339	1,036
Aug.	17,595	16,846	33.4	21,024	843
Sept.	17,990	16,953	33.8	21,185	1,265
Oct.	20,896	18,955	34.0	21,829	...

*Stocks on hand the last of the month or year. †Corrected to 100% from estimate of reported coverage.
Compiled by The Rubber Manufacturers Association, Inc.

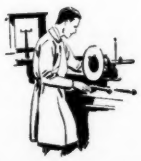
You might class these as "EXTRAS" but they're part of our REGULAR SERVICE

RESEARCH

Our organization includes a large and competent staff of technical engineers. One of the most interesting jobs this staff has before it is the operation of our famous belt clinic where studying the causes of mechanical failures in belts and belting has brought to light much valuable data.

DEVELOPMENT OF SPECIFICATION FABRICS

In addition to the 25,000 fabrics regularly made by our mills we offer the cooperation of our textile engineers to work with you in the development of special fabrics. Our organization has established standard specifications for many industrial fabrics and has published the most complete treatise of its kind — our Handbook of Industrial Fabrics.



LABORATORY CONTROL OF PRODUCTION

Because the 17 modern mills we represent have at their disposal the facilities of our laboratory, which is one of the finest commercial testing laboratories in the country, all of our production is subject to constant laboratory control for quality and uniformity.

CHECK & DOUBLE CHECK ON UNIFORM QUALITY

Realizing the need for keeping quality uniform within recognized limits of tolerance, we check and double check every step in the production process from the purchase of raw cotton to the final inspection of fabric coming from the looms.

WELLINGTON SEARS COMPANY

65 WORTH STREET, NEW YORK, N. Y.

RUBBER SCRAP

THE demand for scrap rubber during November continued active with reclaim production holding at the high level established during October. The market is firm; boots and shoes, floating tubes, solid tires, hard rubber, and garden, and steam and water hose grades advanced in price; while all other types held steady and unchanged.

Consumers' Buying Prices

(Carload Lots for November 24, 1939)

		Prices
Boots and Shoes		
Boots and shoes, black	lb.	$0.01⅛/$0.01¼
Colored	lb.	.01 / .01⅛
Untrimmed arctics	lb.	.01 / .01⅛
Inner Tubes		
No. 1, floating	lb.	.11 / .12
No. 2, compound	lb.	.05 / .05½
Red	lb.	.04¾/ .05
Mixed tubes	lb.	.04½/ .04¾
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	15.00 /16.50
Beadless	ton	19.50 /20.00
Auto tire carcass	ton	30.00 /35.00
Black auto peelings	ton	26.00 /27.00
Solid		
Clean mixed truck	ton	33.00 /35.00
Light gravity	ton	42.00 /44.00
Mechanicals		
Mixed black scrap	ton	20.00 /22.00
Hose, air brake	ton	20.00 /22.50
Garden, rubber covered	ton	12.50 /14.00
Steam and water, soft	ton	12.50 /14.00
No. 1 red	lb.	.03 / .03¼
No. 2 red	lb.	.02¼/ .02½
White druggists' sundries	lb.	.03¼/ .04
Mixed mechanicals	lb.	.02¼/ .02½
White mechanicals	lb.	.03½/ .03¾
Hard Rubber		
No. 1 hard rubber	lb.	.12 / .13

New Incorporations

(*Continued from page 78*)

St., Trenton, N. J. Capital 2,500 shares, no par value. L. Elias, 103 Andrew St., and E. Elias, 19 Caroline St., both of Trenton. A. S. Lewis, agent in charge. Manufacture latex and rubber specialties.

New York Quotations

(*Continued from page 84*)

Stabilizers for Cure			
Laurex, ton lots	lb.		
Stearex B.	lb.		
Beads	lb.		
Stearic acid, single pressed	lb.	$0.10	/$0.11
Stearite	100 lbs.	10.50	
Zinc stearate	lb.	.23	
Synthetic Rubber			
Neoprene Type E	lb.	.65	
G	lb.	.70	
GW	lb.	.75	
H	lb.	.78	
M	lb.	.65	
Latex Type 57	lb.	.30	
Varnish			
Shoe	gal.	1.45	
Vulcanizing Ingredients			
Sulphur			
Chloride, drums	lb.	.035 / .04	
Rubber	100 lbs.	2.00	
Telloy	lb.	1.75	
Vandex	lb.	1.75	
(See also Colors—Antimony)			
Waxes			
Carnauba, No. 3 chalky	lb.		
2 N.C.	lb.		
3 N.C.	lb.		
1 Yellow	lb.		
2	lb.		
Montan, crude	lb.		

J. H. Rudolph & Co., 812 E. Locust St., Dekalb, Ill. Capital 500 shares of common stock at $50 each. J. H. Rudolph, B. A. Hegarty, S. Rubens. Deal in rubber and gutta percha and all goods of which rubber and gutta percha are component parts, raincoats, and fabrics, etc.

Technical Rubber Co., Columbus, O. Capital 250 shares of common stock, no par value, and $500. C. A. Cornell, 644 Jaeger St., Columbus. Manufacture rubber devices.

United States Latex Imports

Year	Pounds (d.r.c.)	Value
1937	51,934,040	$10,213,670
1938	26,606,048	4,147,318
1939		
Jan.	3,589,452	599,927
Feb.	3,844,996	657,565
Mar.	4,491,951	731,302
Apr.	2,270,171	360,739
May	6,240,019	1,067,682
June	4,111,994	694,862
July	6,572,567	1,064,927
Aug.	5,855,400	1,001,012
Sept.	5,656,700	965,615

Data from Leather and Rubber Division, Washington, D. C.

Tire Production Statistics

	Pneumatic Casings		
	Inventory	Production	Shipments
1937	10,383,235	53,309,973	53,485,388
1938	8,451,390	40,182,392	42,330,072
1939			
Jan.	8,932,245	4,581,380	4,163,005
Feb.	9,572,553	4,343,513	3,738,696
Mar.	10,108,584	5,137,030	4,582,655
Apr.	9,997,527	4,211,152	4,355,584
May	9,918,759	4,418,072	4,753,403
June	8,909,495	4,869,862	5,750,149
July	8,300,126	4,510,122	5,055,637
Aug.	8,890,793	5,491,664	4,919,140
Sept.	8,364,147	5,007,219	5,621,088
Oct.	8,656,821	5,430,679	5,187,942

	Pneumatic Casings		
	Original Equipment	Replacement Sales	Export Sales
1937	22,352,601	29,886,326	1,246,461
1938	10,716,130	30,565,008	1,048,934
1939			
Jan.	1,685,190	2,353,822	123,993
Feb.	1,472,356	2,159,901	106,439
Mar.	1,746,999	2,719,450	116,206
Apr.	1,528,637	2,736,155	90,792
May	1,414,798	3,240,936	97,669
June	1,370,317	4,264,298	98,739
July	808,611	4,160,319	86,707
Aug.	610,771	4,198,410	109,959
Sept.	1,248,773	4,203,887	112,069
Oct.	1,804,648	3,238,829	144,465

	Inner Tubes		
	Inventory	Production	Shipments
1937	10,311,745	52,373,330	52,766,728
1938	8,165,696	37,847,656	40,292,614
1939			
Jan.	8,068,700	4,097,759	3,935,652
Feb.	8,414,652	3,680,521	3,334,791
Mar.	8,900,944	4,470,184	4,015,333
Apr.	8,837,313	3,841,308	3,927,033
May	8,839,536	3,847,827	4,154,390
June	8,043,999	4,319,943	5,123,108
July	7,818,822	4,043,028	4,285,435
Aug.	8,238,406	4,918,165	4,432,396
Sept.	7,845,764	4,512,460	5,024,992
Oct.	7,716,531	5,072,648	5,011,880

Source: The Rubber Manufacturers Association, Inc. Figures adjusted to represent 100% of the industry.

U. S. Crude and Waste Rubber Imports for 1939

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Totals 1939	Totals 1938	Balata	Miscellaneous	Waste
Jan. tons	36,672	1,521	560	56	9	264	39,082	42,135	61	803	328
Feb.	34,185	1,463	239	348	3	252	36,490	43,930	45	685	54
Mar.	36,434	1,885	229	208	4	229	38,989	35,967	33	649	29
Apr.	27,991	784	487	142	1	196	29,601	30,807	65	275	246
May	44,015	2,167	413	761	7	172	47,535	27,410	78	759	151
June	33,956	1,489	318	42	3	139	35,947	26,011	107	680	7
July	33,211	2,511	456	292	..	269	36,739	22,918	46	884	104
Aug.	34,801	2,260	276	453	2	253	38,045	31,099	46	766	42
Sept.	39,148	2,312	324		42	113	41,939	37,374	92	444	8
Oct.	38,202	1,863	363	355	160	307	41,250	34,496	159	582	65
Total, 10 mos., 1939 tons	358,615	18,255	3,665	2,657	231	2,194	385,617	.....	732	6,527	1,034
Total, 10 mos., 1938 tons	316,672	8,714	2,637	1,689	195	2,240	.....	332,147	556	7,578	328

Compiled from The Rubber Manufacturers Association, Inc., statistics.

British Malaya Imports*

From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
	—Aug., 1939—		—Sept., 1939—		—Oct., 1939—	
Sumatra	3,040	77	7,688	276	9,422	554
Dutch Borneo	1,117	...	2,618	15	2,959	31
Java and other Dutch islands	90	...	177	...	521	1
Sarawak	1,964	38	1,754	5	2,809	30
British Borneo	209	...	188	2	898	53
Burma	155	...	93	7	114	...
Siam	3,783	817	3,538	958	2,396	411
French Indo-China	1,106	136	730	129	1,046	126
Other countries	95	8	114	10	111	11
Totals	11,559	1,076	16,900	1,402	20,276	1,217

*Figures on rubber gross exports: Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham are being temporarily withheld.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge.*

SITUATIONS WANTED

WORKS MANAGER — SUPERINTENDENT — AMERICAN, EMployed South America as works manager and technical adviser to manufacturers of tires, tubes, upholstery cloth, raincoat materials, mechanical goods, footwear; thorough knowledge latex chemistry, plastics molding, compounding, development, production, supervision; organize, train, and handle labor efficiently; twenty-five years' rubber and plastics manufacturing experience; accept position anywhere. Address Box No. 43, care of INDIA RUBBER WORLD.

WELL-KNOWN EXECUTIVE, CHEMIST, WITH MANY YEARS practical and theoretical experience in development and manufacture of cut rubber thread for corset and golf-ball trades. Also rubber-covered rolls and tank linings for paper, textile, and printing industries. At present holds responsible technical position, but wishes to contact established concern desirous of starting new and profitable departments. Willing to invest some capital or go in on profit-sharing basis. Address Box No. 46, care of INDIA RUBBER WORLD.

CHEMIST WITH VARIED PLANT AND LABORATORY EXPERIence in compounding, testing, and reclaiming. Also the preparation, analysis, and evaluation of mineral fillers, including photomicrography. Address Box No. 47, care of INDIA RUBBER WORLD.

OFFSET BLANKET DIVISION FOREMAN. CAPABLE OF TAKING complete charge. Experience throughout. Address Box No. 48, care of INDIA RUBBER WORLD.

INDUSTRIAL ENGINEER AND COST ACCOUNTANT. THOROughly experienced in cost work, can install and operate department. Also experienced in tire and tube construction and specification work, rate setting, and plant layout, both in large and small plants; also rubber specialties. Good record and references. Moderate salary. Address Box No. 52, care of INDIA RUBBER WORLD.

FOSTER D. SNELL, INC.
Chemists—Engineers
Every form of Chemical Service
305 Washington Street Brooklyn, N. Y.

Compounding Ingredients for Rubber
by the Editors of
INDIA RUBBER WORLD
$2.50 Postpaid in U. S. A. $2.75 Elsewhere

MECHANICAL
MOLDED RUBBER GOODS
Sponge Rubber: Sheeted—Die Cut—Molded
We Solicit Your Inquiries
THE BARR RUBBER PRODUCTS COMPANY
SANDUSKY, OHIO

SITUATIONS WANTED (Continued)

CHEMICAL—TECHNICAL EXECUTIVE, UNIVERsity graduate, with comprehensive experience in the rubber, latex, balata, and synthetic plastics industries, desires a connection with a progressive rubber manufacturing concern in a suitable capacity. Particularly successful in large-scale product development for major industries. Address Box No. 53, care of INDIA RUBBER WORLD.

EXPORT SALES POSITION. FORMERLY WITH LARGE RUBBER firm. Good contacts Europe, South America, bathing, surgical, sanitary, dipped goods, etc. Speak French, German, Dutch, Swedish. Address Box No. 54, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

YOUNG TIRE ENGINEER WITH A FEW YEARS' EXPERIENCE in design and construction supervision. Eastern company. State age, experience, and salary expected. Replies held confidential. Address Box No. 45, care of INDIA RUBBER WORLD.

CHIEF CHEMIST WANTED BY LEADING RUBBER company located in the vicinity of New York City. Prefer man with experience in synthetic rubbers, especially as applied to fabrics. Unusual opportunity for alert progressive man. Address Box No. 49, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

RUBBER SAVES TREES—Modern tree preservation requires high-type men. Practical training in forest camp schools. For brochure—Van Yahres, Westbury, N. Y.

WANTED: MOLD MAKER WITH FACILITIES TO MANUFACture molds for vacuum cleaner wheels. Must be very reasonable. Address Box No. 50, care of INDIA RUBBER WORLD.

Help You to Profits
ARTHUR T. HOPKINS
Hamblen Farm, Cape Cod, Wellfleet, Mass.

INTERNATIONAL PULP CO.
41 Park Row, NEW YORK, N. Y.
SOLE PRODUCERS
ASBESTINE
REG. U. S. PAT. OFF.

ROBERT BADENHOP CORPORATION
•
CRUDE RUBBER
GUTTA PERCHA
LIQUID LATEX
GUTTA SIAK
BALATA
•
WOOLWORTH BLDG. (TEL. CORTLAND 7-6920) NEW YORK, N.Y.

(Advertisements continued on page 91)

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	September, 1939 Quantity	September, 1939 Value	Nine Months Ended September, 1939 Quantity	Nine Months Ended September, 1939 Value
UNMANUFACTURED—*Free*				
Liquid latex (solids).....*lb.*	5,656,700	$965,615	42,642,250	$7,143,633
Jelutong or pontianak....*lb.*	1,072,103	100,285	12,096,371	1,275,428
Balata .....*lb.*	80,235	19,682	957,587	145,647
Gutta percha .....*lb.*	231,700	40,364	2,445,416	370,042
Guayule .....*lb.*	308,800	30,091	3,362,200	303,890
Scrap and reclaimed.....*lb.*	566,932	9,561	8,095,873	138,179
Totals	7,916,470	$1,165,598	69,599,697	$9,376,819
Misc. rubber (above), 1,000 *lbs.*	7,916	$1,165,598	69,600	$9,376,819
Crude rubber.....1,000 *lbs.*	78,413	12,667,740	715,037	111,930,120
Totals .....1,000 *lbs.*	86,329	$13,833,338	784,637	$121,306,939
Chicle, crude .....*lb.*	42,297	$15,981	11,227,531	$3,922,009
MANUFACTURED—*Dutiable*				
Rubber tires .....*no.*	2,400	7,442	23,797	87,744
Rubber boots, shoes, and overshoes .....*prs.*	2,550	320	13,014	3,552
Rubber soled footwear with fabric uppers .....*prs.*	53,371	8,378	612,092	113,861
Golf balls .....*no.*	6,484	954	463,473	47,803
Lawn tennis balls.....*no.*	2,160	166	1,053,323	113,736
Other rubber balls.....*no.*	149,487	3,973	2,501,845	83,552
Other rubber toys.....*lb.*	7,326	1,281	200,660	32,225
Hard rubber combs.....*no.*	12,096	1,134	555,345	41,705
Other manufactures of hard rubber	.....	3,845	.....	21,206
Friction or insulating tape.*lb.*	1,951	243	121,559	25,284
Belts, hose, packing, and insulating material.....	.....	4,931	.....	54,934
Druggists' sundries of soft rubber	.....	3,058	.....	44,846
Inflatable swimming belts, floats, etc. .....*no.*	15,360	914	548,871	35,013
Other rubber and gutta percha manufactures.....	.....	10,234	.....	392,070
Totals	.....	$46,873	.....	$1,097,531

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber .....*lb.*	3,298,227	$659,055	10,966,013	$1,881,924
Balata .....*lb.*	64,387	15,090	112,466	26,575
Other rubber, rubber substitutes and scrap.....*lb.*	66,657	3,099	207,967	11,792
Rubber manufactures (including toys)	.....	2,331	.....	19,083
Totals	.....	$679,575	.....	$1,939,374

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed .....*lb.*	2,833,513	$149,984	17,455,728	$900,731
Scrap .....*lb.*	6,943,494	97,658	79,476,719	1,245,387
Cements .....*gal.*	54,673	85,891	404,396	519,777
Rubberized auto cloth..*sq. yd.*	13,124	5,833	136,306	69,713
Other rubberized piece goods and hospital sheeting..*sq. yd.*	211,293	70,442	103,742	778,021
Boots .....*prs.*	6,097	14,759	66,711	147,295
Shoes .....*prs.*	10,475	8,164	141,969	83,589
Canvas shoes with rubber soles .....*prs.*	20,083	14,273	431,092	290,335
Soles .....*doz. prs.*	2,908	6,945	32,161	68,996
Heels .....*doz. prs.*	26,854	16,121	327,380	181,303
Soling and top lift sheets.*lb.*	58,609	11,214	480,162	94,194
Gloves and mittens..*doz. prs.*	12,965	26,507	84,012	178,864
Water bottles and fountain syringes .....*no.*	30,957	9,925	206,172	71,739
Other druggists' sundries...	.....	97,496	.....	540,193
Gum rubber clothing....*doz.*	11,133	39,290	216,777	498,160
Balloons .....*gross*	41,129	34,692	301,159	235,494
Toys and balls.....	.....	17,887	.....	126,088
Bathing caps .....*doz.*	1,357	2,970	43,238	85,089
Bands .....*lb.*	13,969	5,124	192,689	78,037
Erasers .....*lb.*	16,586	8,709	213,565	116,427
Hard rubber goods				
Electrical battery boxes.*no.*	18,701	12,444	150,749	107,304
Other electrical .....*lb.*	26,598	7,201	199,989	56,751
Combs, finished .....*doz.*	20,494	12,063	125,978	73,272
Other hard rubber goods....	.....	13,368	.....	120,440
Tires				
Truck and bus casings.*no.*	35,958	632,014	234,455	4,510,773
Other auto casings....*no.*	77,700	846,146	576,912	6,052,881
Tubes, auto .....*no.*	80,546	125,250	558,497	887,227
Other casings and tubes..*no.*	6,424	57,663	95,339	735,765
Solid tires for automobiles and motor trucks....*no.*	97	3,756	2,465	35,208
Other solid tires.....*lb.*	7,286	2,111	140,936	31,950
Tire sundries and repair materials .....*lb.*	322,891	82,624	2,093,638	588,344
Rubber and friction tape..*lb.*	57,538	15,718	478,828	139,492
Fan belts for automobiles.*lb.*	55,251	33,682	488,557	282,846
Other rubber and balata belts .....*lb.*	230,625	130,277	2,217,880	1,227,983
Garden hose .....*lb.*	48,411	9,669	746,437	155,983
Other hose and tubing....*lb.*	1,576,341	644,044	6,029,316	2,351,692
Packing .....*lb.*	129,061	54,275	942,383	419,650
Mats, matting, flooring, and tiling .....*lb.*	121,006	18,204	971,624	148,588
Thread .....*lb.*	21,140	18,987	492,125	432,004
Gutta percha manufactures.*lb.*	94,403	27,559	1,147,183	333,402
Other rubber manufactures..	.....	155,517	.....	1,195,822
Totals	.....	$3,626,456	.....	$26,196,809

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	COMMODITY	CITY AND COUNTRY
¶4263	Insulating tape	Stockholm, Sweden
*4274	Insulated wire	Santiago, Chile
‡4289	Tennis and basket balls and rubber-soled shoes	Alexandria, Egypt
*4290	Rubber sheeting for dress shields	Amsterdam, Netherlands
†4294	Combs	Oslo, Norway
‡4295	Hot water bags	Lima, Peru
*4296	Surgical rubber goods	Lima, Peru
*4302	Bathing slippers	Lima, Peru
*4308	Insulated wire and lead-covered cable	Montevideo, Uruguay
†4317	Elastic webbing	Stockholm, Sweden
‡4321	Elastic webbing	Melbourne, Australia
†4322	Druggists' sundries, air cushions, and sponges	Sydney, Australia
†4323	Tires	Brussels, Belgium
†4331	Metal glove forms	Buenos Aires, Argentina
‡4341	Shoes	Reykjavik, Iceland
*4354	Cable and insulated wire	Lima, Peru
†4356	Cycle tires and tubes	Blumenau, Brazil
‡4365	Hospital sheeting, water bottles, fountain syringes, gloves, corsets, dress shields, hose, balloons, and toys	Alexandria, Egypt
*4371	Surgical rubber goods	Caracas, Venezuela
*4378	Bicycle tires and technical rubber goods	Stockholm, Sweden
*4382	Garters and suspenders	Cali, Colombia
*4388	Rubber articles and toys	Guayaquil, Ecuador
*4402	Druggists' sundries	San Pedro Sula, Honduras
†4444	Unvulcanized can rings	Cairo, Egypt
*4457	Toys	Cairo, Egypt
*4459	Air mats	Oslo, Norway
*4485	Suspenders, garters, and elastic-top socks	Lima, Peru
*4486	Surgical rubber goods and sport goods	Lima, Peru
†4516	Rubber chemicals	Oslo, Norway
*4529	Wire and cable	Habana, Cuba
†4531	Storage batteries and parts and insulated wire and cable	Tandjong Priok, Java
†4534	Insulated wire and cable	Stockholm, Sweden
†4570	Hard rubber and wood battery separators	Brussels, Belgium
†4598	Balloons	Quibdo, Colombia
*4599	Household, pharmaceutical, and surgical rubber goods	Cairo, Egypt
*4632	Baby pants	Mexico City, Mexico
*4639	Bathing shoes and caps, baby feeders with rings, and football bladders	Lima, Peru
*4648	Automobile topping	Santiago, Chile
*4652	Raincoats	Copenhagen, Denmark
†4664	Bicycle tires and tubes	Stockholm, Sweden
‡4668	Automobile molded rubber parts and automotive igintion cables and insulating materials	Melbourne, Australia
*4677	Garters	Port-au-Prince, Haiti
*4706	Druggists' sundries	Cairo, Egypt
†4708	Druggists' sundries and combs	Dublin, Ireland
‡4714	Cigar holders and tobacco pouches	Alexandria, Egypt
†4716	Battery equipment and parts	Dublin, Ireland
†4717	Wire and cable	Batavia, Java
*4739	Wire and hose	Habana, Cuba
†4755	Rubber-goods manufacturing machinery	Valparaiso, Chile
†4761	Rubber thread	Alexandria, Egypt
†4762	Fire hose	Amsterdam, Netherlands
‡4763	Crude rubber	Montevideo, Uruguay
*4765	Automobile accessories and parts	Buenos Aires, Argentina
‡4776	Surgical, medical, and hospital rubber goods	Amsterdam, Netherlands
‡4777	Surgical rubber sundries (dipped goods), fountain pens, and stationery articles	Cairo, Egypt
*4780	Bathing caps, shoes, belts, surgical gloves, hot-water bags, sponges, tubing, and desk and office supplies	Lima, Peru
¶4785	Bathing caps	Batavia, Java

*Agency. †Purchase. ‡Purchase and agency. ¶Purchase or agency.

Imports by Custom Districts

	—September, 1939— *Crude Rubber Quantity	Value	—September, 1938— *Crude Rubber Quantity	Value
Vermont .....*lbs.*	850	$128	.....	.....
Massachusetts	12,326,338	2,024,727	7,360,253	$1,132,336
St. Lawrence	4,690	715	.....	.....
Buffalo	3,428	343	.....	.....
New York	56 805120	9,243,398	61,327,618	8,508,846
Philadelphia	1,329 096	220,451	156,200	20,190
Maryland	1,894,851	292,567	1,829,408	219,029
Virginia	.....	.....	316,443	46,411
Georgia	.....	.....	904 157	108,199
Mobile	1,322,495	189,381	938,356	96,875
New Orleans	2 673,697	419,334	806,533	93 518
Galveston	49,564	7,409	22,400	2,877
El Paso	44,800	4,399	.....	.....
Los Angeles	7,261,733	1,153 711	4,630,935	608,770
San Francisco	571,436	89,896	470 283	65,706
Oregon	33,600	5,324	15 680	2,330
Ohio	57,229	11,663	67,200	9,379
Colorado	.....	.....	89,600	8,837
Totals	84,378,927	$13 663,446	78,935.066	$10,923 303

*Crude rubber including latex dry rubber content.